

**INSTALLATION AND SERVICE
MANUAL**

**HP 21MX
COMPUTER SERIES**

Manual part no. 02108-90006

Microfiche part no. 02108-90007

Printed: AUG 1974

HEWLETT  PACKARD

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LIST OF EFFECTIVE PAGES

Pages	Issue	Pages	Issue
Title	Original	2-29	Original
ii thru v	Original	2-30 (blank)	Original
1-1 thru 1-13	Original	2-31	Original
2-1	Original	2-32 (blank)	Original
2-2 (blank)	Original	2-33	Original
2-3	Original	2-34 (blank)	Original
2-4 (blank)	Original	2-35	Original
2-5 thru 2-11	Original	2-36 (blank)	Original
2-12 (blank)	Original	2-37	Original
2-13	Original	2-38 (blank)	Original
2-14 (blank)	Original	2-39	Original
2-15	Original	2-40 (blank)	Original
2-16 (blank)	Original	2-41	Original
2-17 thru 2-23	Original	2-42 (blank)	Original
2-24 (blank)	Original	2-43	Original
2-25	Original	2-44 (blank)	Original
2-26 (blank)	Original	2-45	Original
2-27	Original	3-1 thru 3-6	Original
2-28 (blank)	Original		

This manual provides installation and field service instructions for the Hewlett-Packard 21MX Computer Series. The HP 21MX is a state-of-the-art product and, because of the product design, a complete modular replacement philosophy has been implemented to minimize on-site repair time. Repair is assured through the use of a service tool which is, in itself, a complete and operational HP 21MX Computer. Thus, service personnel may replace any assembly within the HP 21MX mainframe.

Supporting documentation for the HP 21MX Computer Series are as follows:

- a. *HP 21MX Computer Series Installation and Service Manual*, part no. 02108-90006.
- b. *HP 21MX Computer Series Reference Manual*, part no. 02108-90002.
- c. *HP 21MX Computer Series Operator's Manual*, part no. 02108-90004.
- d. *Microprogramming HP 21MX Computers Operating and Reference Manual*, part no. 02108-90008.
- e. *HP 12979A Input/Output Extender Operating and Reference Manual*, part no. 12979-90007.
- f. *HP 12979A Input/Output Extender Installation and Service Manual*, part no. 12979-90006.

An Engineering Supplement package is also available to those who wish in-depth knowledge about the architecture and logic elements of the HP 21MX Computer Series. Consult your local Hewlett-Packard Sales and Service Office for details regarding this package. A list of Sales and Service Offices is provided at the back of this manual.

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INSTALLATION

SECTION

I

This section provides installation instructions for the processor mainframe. Included in these instructions are site preparation data, unpacking and inspection, configuration requirements, installation procedures, performance verification, and recommended packing and shipping methods.

1-1. SITE PREPARATION

Site preparation information for the processor mainframe includes environmental limitations, power requirements, and mounting considerations. If the processor is purchased as part of a computer system, disregard the contents of paragraphs 1-2 through 1-5 herein and refer instead to the *Hewlett-Packard 2000 Computer Systems Site Preparation Manual*, part no. 02000-90097.

1-2. ENVIRONMENTAL LIMITATIONS

Environmental limitations for operating and non-operating conditions of the processor are specified in table 1-1. The environmental limitations imposed by peripheral devices and associated components must be taken into consideration when the processor is located in the same area.

Table 1-1. Processor Environmental Limitations

AMBIENT TEMPERATURE	
Operating:	0° to 55°C (32° to 131°F)
Nonoperating:	-40° to 75°C (-40° to 167°F)
ALTITUDE	
Operating:	15,000 feet (4,573 meters)
Nonoperating:	25,000 feet (7,622 meters)
RELATIVE HUMIDITY	
20 to 95% at 25° to 40°C (77° to 104°F) without condensation.	

1-3. POWER REQUIREMENTS

The processor is shipped with the power supply configured to operate from single-phase power mains of 110 ±20% volts (standard) or 220 ±20% volts (option 015) as specified in the purchase order. Maximum power consumption of the HP 2105A and HP 2108A is 400 watts and 525 watts, respectively.

Various safety codes require that instrument chassis, panels, and housings be grounded to protect operating and service personnel. A grounded three-conductor female power outlet must be made available to satisfy this requirement.

1-4. COOLING REQUIREMENTS

There are no external cooling requirements for the processor. Two internal fans provide adequate ventilation when operated within the environmental limitations specified in table 1-1.

1-5. MOUNTING CONSIDERATIONS

The processor may be used either as a freestanding device or mounted in a standard 19-inch (483-millimeter) equipment rack. When used in a mobile environment, the processor should be installed in a shock-mounted equipment rack. Rack-mounting dimensions for the processors are specified in table 1-2.

Table 1-2. Rack-Mounting Dimensions

PROCESSOR	HEIGHT	WIDTH*	DEPTH**
HP 2105A	5-¼ in. (133 mm)	16-¾ in. (425 mm)	24-½ in. (622 mm)
HP 2108A	8-¾ in. (223 mm)	16-¾ in. (425 mm)	24-½ in. (622 mm)
*Behind rack mount. **Required rack depth.			

1-6. UNPACKING AND INSPECTION

The processor and accessories may be shipped in more than one container. When the shipment arrives, check to ensure the receipt of all containers as specified by the carrier's papers. Inspect each shipping container immediately upon receipt for evidence of mishandling during transit. If any container is damaged in any way, or if any container is water-stained, request the carrier's agent be present when that container is opened.

Open the shipping container(s) and locate the envelope marked "CUSTOMER RECORDS." One of the items in this envelope is a list of equipment supplied. Compare this list against the purchase order to verify that the shipment is correct. Unpack the shipping container(s) and inspect each item for external damage. Look for damage such as broken controls and connectors, dented corners, bent panels,

scratches, and loose components. Check also the rigid foam-plastic cushioning (if used) for signs of deformation which could be indicative of rough handling during transit.

If an HP 2108A Processor that includes a power fail recovery system is being installed, proceed as follows:

- Loosen screw located in rear fold of top cover.
- Slide top cover toward rear of processor to expose battery PCA's. (See figure 3-2 indexes 14A, 14B, and 14C.)
- Remove foam-plastic shipping block from top of battery PCA's.
- Ensure that battery PCA's are seated fully into mating receptacles on lower power supply PCA.
- Slide rear cover into place and tighten screw in rear fold.

If the visual examination reveals any damage to the processor or accessories, follow the damage-claim procedure described in paragraph 1-33. Retain the shipping container(s) and packing material for examination in the settlement of claims or for future reuse.

1-7. PHYSICAL INVENTORY

1-8. MANUALS

Check to ensure that all manuals listed in the "CUSTOMER RECORDS" envelope have been received.

1-9. EQUIPMENT

1-10. PROCESSOR. The processor model number and serial number are stamped on an identification label affixed to the rear panel. Ensure that both the model number and serial number are identical with those specified in the "CUSTOMER RECORDS" envelope. A typical identification label is illustrated in figure 1-1.

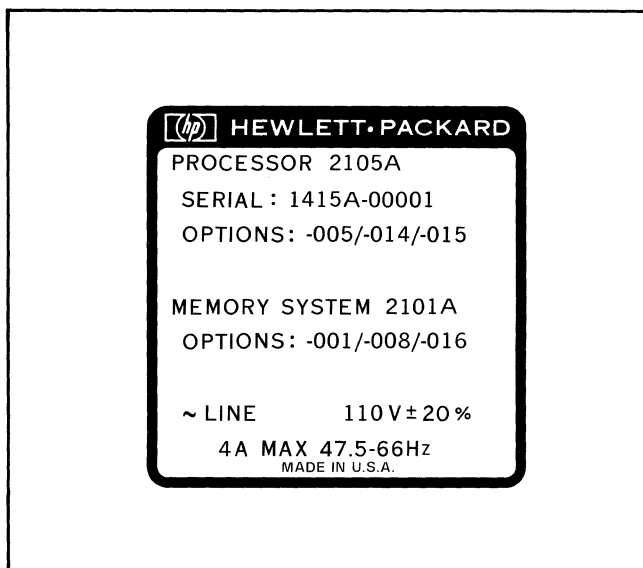
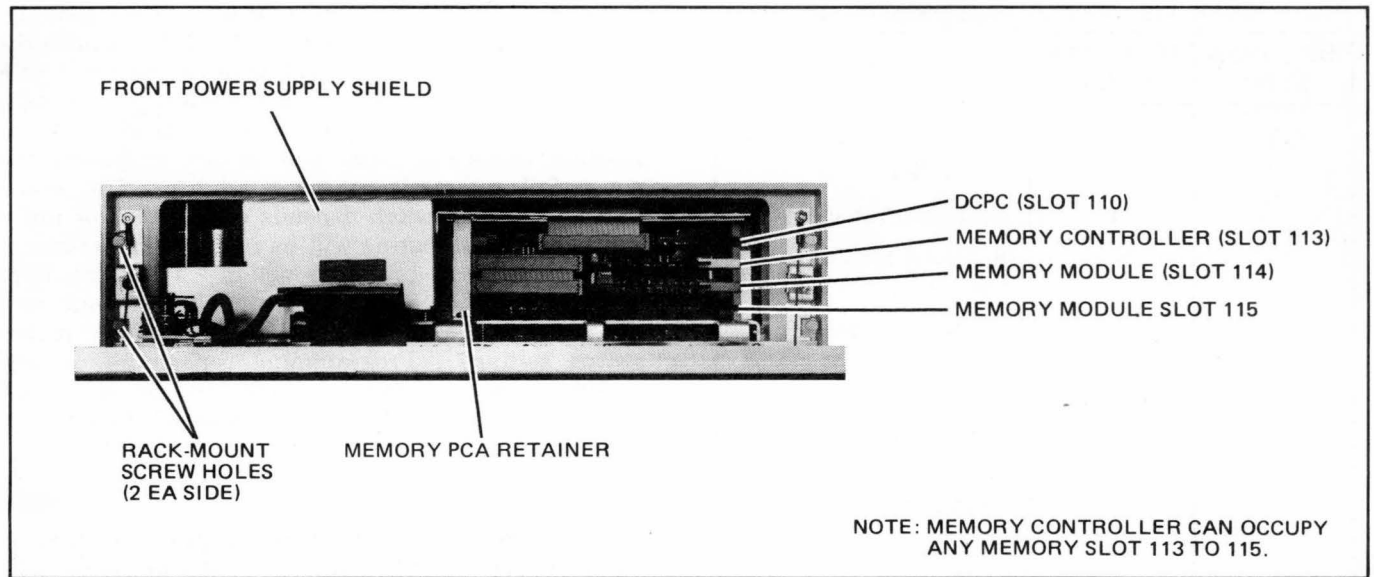


Figure 1-1. Typical Identification Label

All processor options specified in the purchase order are installed and tested at the factory. Each processor option installed at the factory is identified by a three-digit number (e.g., -003/-005/-015/. . .) stamped on the identification label. Check these numbers to ensure the inclusion of those options specified in the "CUSTOMER RECORDS" envelope.

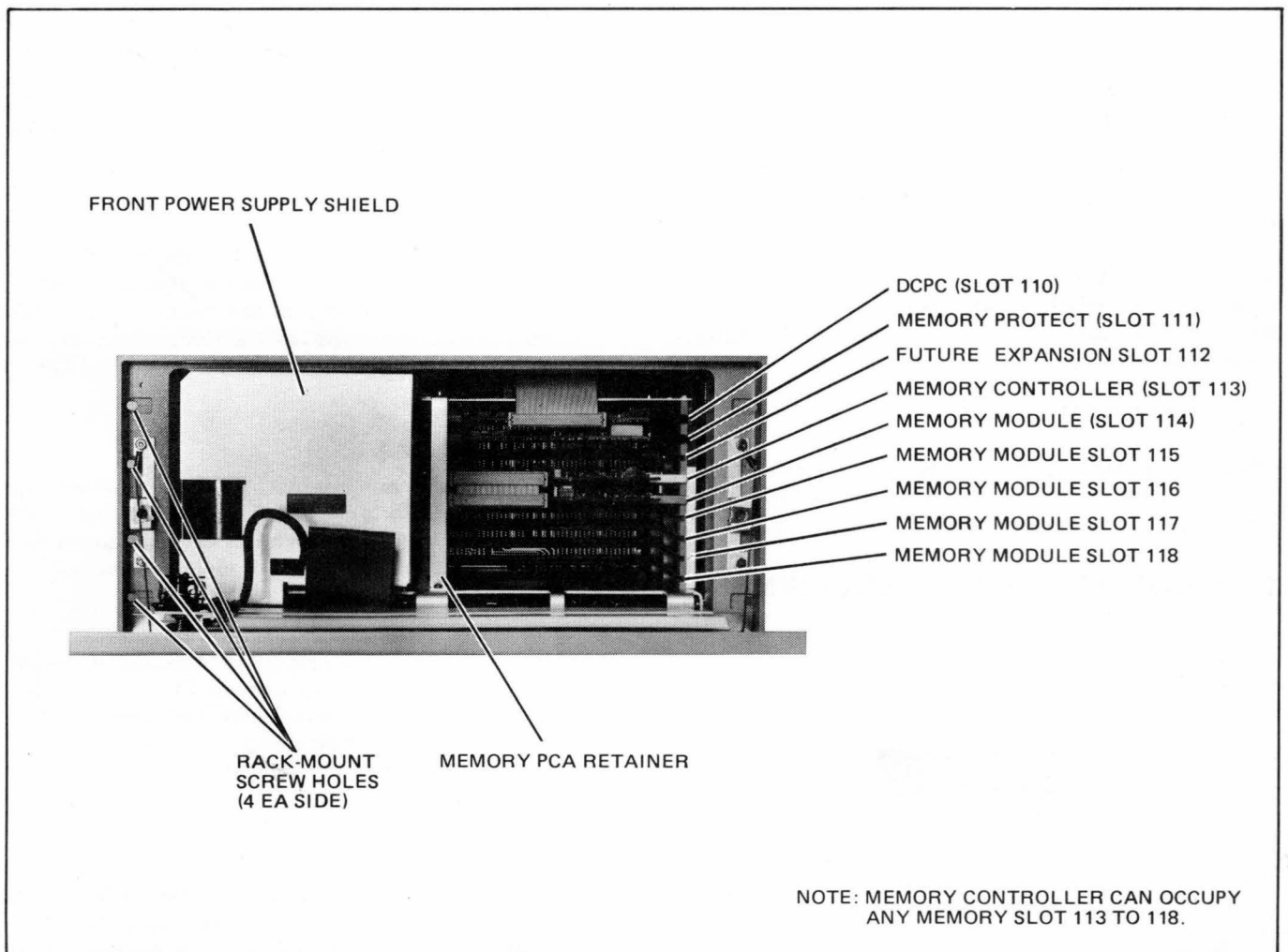
1-11. MEMORY SYSTEM. The memory system and memory options specified in the purchase order are installed and tested at the factory. As shown in figure 1-1, the memory configuration is identified by the memory system model number and one or more three-digit option numbers (e.g., -001/-004/-016/. . .). Check these numbers to ensure the inclusion of the proper memory configuration specified in the "CUSTOMER RECORDS" envelope.

Loosen the two quarter-turn fasteners on the operator panel and lower the panel assembly to the memory access position as shown in figures 1-2 and 1-3. Notice that the memory slot numbers are stamped on the right-hand side of the memory PCA cage. These slot numbers are allocated to the functions listed in table 1-3, which shows that the memory controller PCA can be installed in any slot from 113 upward. If an HP 2101A Memory System is installed, the memory module PCA's may be configured for either 8K or 16K of memory. If an HP 2102A Memory System is installed, the memory module PCA's may be configured for either 4K or 8K of memory. Verify that all connectors are seated firmly onto the PCA front edge connectors. Replace the operator panel assembly and tighten the two quarter-turn fasteners.



7021-4

Figure 1-2. HP 2105A Processor Memory PCA Cage



7021-5

Figure 1-3. HP 2108A Processor Memory PCA Cage

Table 1-3. Memory Slot Assignments

HP 2105A SLOT	HP 2108A SLOT	ASSIGNMENT
110	110	Dual-Channel Port Controller
-	111	Memory Protect
-	112	Reserved for Future Use
113	113	Memory or Memory Controller
114	114	Memory or Memory Controller
115	115	Memory or Memory Controller
-	116	Memory or Memory Controller
-	117	Memory or Memory Controller
-	118	Memory or Memory Controller

1-12. INPUT/OUTPUT INTERFACES. At the rear of the processor, disconnect the battery cable (if present) from the BAT. INPUT connector and remove the input/output PCA cage cover. (Figures 1-4 and 1-5 show the rear panel of the processor with the I/O PCA cage cover removed.) Verify that the proper input/output interface PCA's have been furnished in accordance with the purchase order and as specified in the "CUSTOMER RECORDS" envelope. Replace the I/O PCA cage cover and reconnect the battery cable (if present).

1-13. PROGRAM TAPES

Check the punched tapes received with the shipment to ensure that all tapes listed in the "CUSTOMER RECORDS" envelope are present.

1-14. CONFIGURATION REQUIREMENTS

1-15. INTERNAL SWITCH SETTINGS

WARNING

Hazardous voltages are exposed when the bottom cover is removed and ac power is applied.

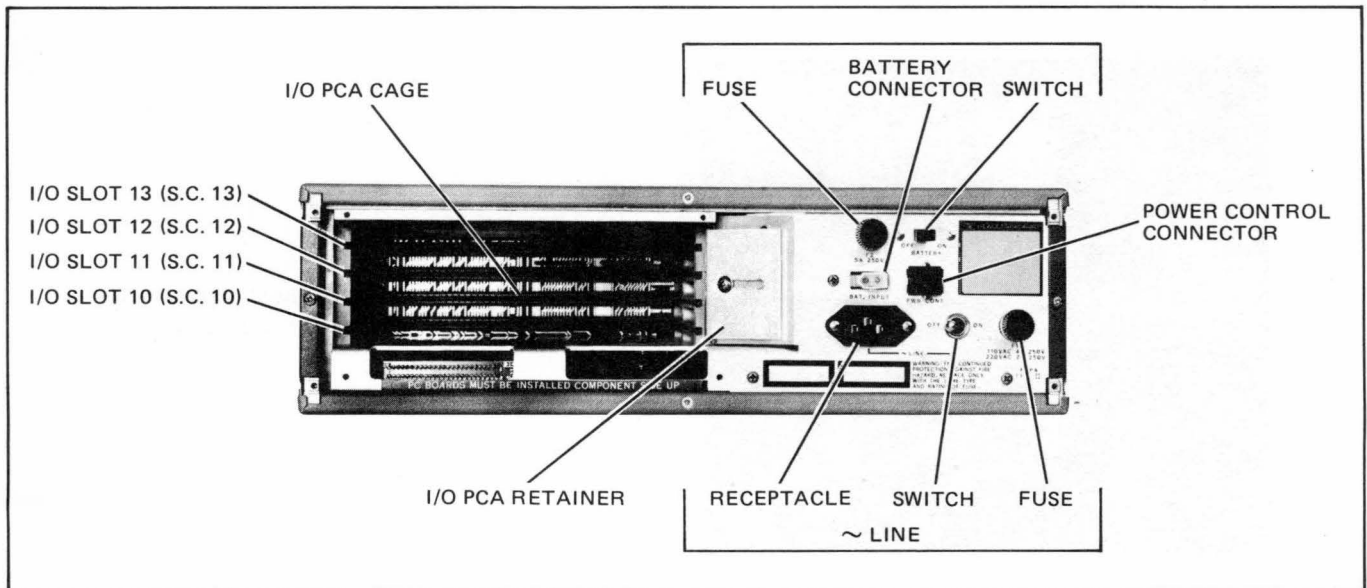
Remove the bottom cover of the processor and locate the two toggle switches (A1S1 and A1S2) mounted on

the rear of the central processor unit PCA. (See figure 1-6.) The position of switch A1S1 determines the action that the processor will take in the event of a parity error or memory protect violation (assuming that a memory protect PCA is installed) and the position of switch A1S2 will enable or disable the power fail/automatic restart capability. The proper setting of each switch depends on whether or not a user-written subroutine will be included to accommodate the required processor action. Therefore, refer to paragraphs 1-16 and 1-17 and then consult with the system programmer to determine the proper switch settings. Programming considerations concerning these switches are given in the *HP 21MX Computer Series Reference Manual*, part no. 02108-90002.

1-16. PARITY ERROR/MEMORY PROTECT SWITCH A1S1. The action that the processor will take when a parity error or a memory protect violation occurs is determined by the following alternative switch settings:

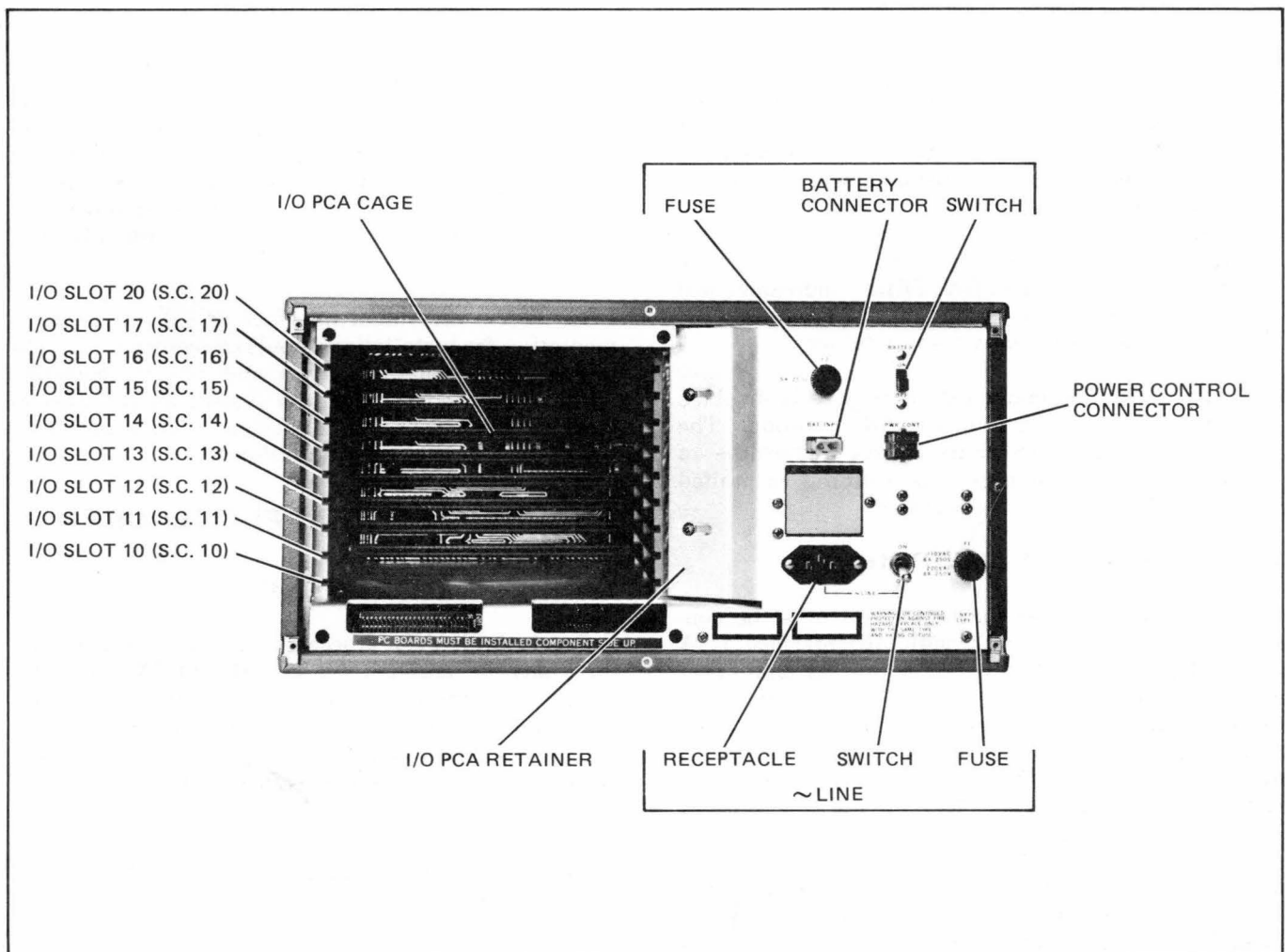
- a. **HALT PE.** When switch A1S1 is in the HALT PE position and a parity error is detected during a read cycle, the processor will halt and light the PARITY indicator on the operator panel. The PARITY indicator will remain lighted until the PRESET switch is pressed.
- b. **INT/IGNORE.** When switch A1S1 is in the INT/IGNORE position and a parity error or a memory protect violation occurs, the computer will take one of the following two actions depending on whether or not the memory protect PCA is installed:
 - (1) If the memory protect PCA is installed and enabled by an STF 05 instruction, an interrupt to memory location 00005 is generated when a memory protect violation occurs.
 - (2) If the memory protect PCA is not installed, or if the memory protect PCA is installed but the parity error logic has been disabled by a CLF 05 instruction, the parity error will be ignored and the PARITY indicator will light.

1-17. AUTOMATIC RESTART SWITCH A1S2. The action that the processor will take upon the restoration of primary power (following a momentary or prolonged power failure) is determined by the following alternative switch settings:



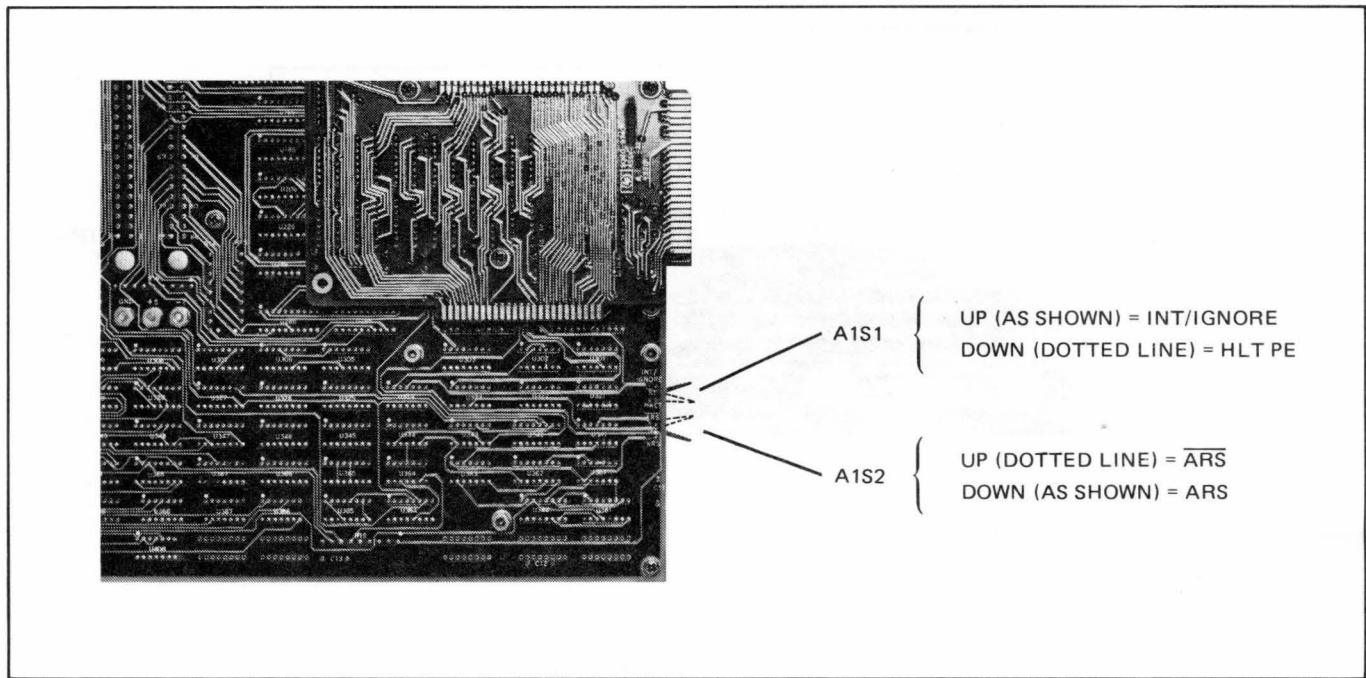
7021-6

Figure 1-4. HP 2105A Processor Rear View



7021-7

Figure 1-5. HP 2108A Processor Rear View



7021-8

Figure 1-6. Internal Switch Configuration

- a. ARS. The automatic restart feature is enabled when switch A1S2 is in the ARS position. After a built-in time delay of about half a second following the return to normal power levels, the processor will interrupt to memory location 00004₈ provided that the memory was sustained. This permits entry into a restart program. The POWER FAIL/BATTERY indicator will light when power is restored regardless of whether or not memory was sustained.
- b. $\overline{\text{ARS}}$. The automatic restart feature is disabled when switch A1S2 is in the ARS position. The processor is halted immediately regardless of whether the processor was running or halted when the power failure occurred.

1-18. I/O PRIORITY ASSIGNMENT

Each peripheral device in the system must be connected to the processor through an interface PCA installed in the I/O PCA cage. A priority chain connects all interface PCA's in series to prevent simultaneous interrupt requests from two or more peripherals. The priority of the interface PCA is determined by the I/O slot that the PCA occupies, with slot 10 (select code 10₈) having the highest priority; the highest numbered I/O slot has the lowest priority. (See figures 1-4 and 1-5.) Interrupts from a higher priority device inhibit lower priority interrupts by breaking the priority chain. If the interrupt mode is used, there can be no vacant slots from select code 10₈ to the highest select code used due to the priority chaining scheme.

From a standpoint of time, it is more economical to assign the higher priorities to high-speed devices and the lower priorities to low-speed devices. However, if a subsystem could suffer catastrophic information loss if not serviced immediately, then that subsystem should be assigned the highest priority regardless of speed.

Refer to the individual interface or subsystem documentation for installation details concerning I/O PCA jumper assignments (if any) and priority considerations. Then confer with the system programmer to establish the desired I/O device priority and configure the I/O PCA cage accordingly.

1-19. INSTALLATION PROCEDURE

1-20. MANUAL UPDATING

Before installing the processor, perform any updating that may be required for the HP 21MX Computer Series documentation. (A list of directly related hardware and software documentation is provided in the preface to this manual.) Updating instructions (if any) are provided in a supplement inside the front cover of the appropriate document.

1-21. TOOLS AND TEST EQUIPMENT REQUIRED

1-22. TOOLS. No installation tools other than ordinary handtools are required.

Table 1-4. Installation Test Equipment

INSTRUMENT	CRITICAL SPECIFICATIONS	RECOMMENDED HP MODEL
Digital Voltmeter	At least four-digit readout. Minimum input impedance 10 megohms; full-scale ranges of 0.999 and 99.99 volts dc.	HP 3439A Digital Voltmeter with HP 3441A Range Selector.
AC Voltmeter	Expanded-scale or digital-readout type capable of measuring ac power mains to $\pm 1.0\%$. Voltage range must be from 88 to 132 volts ac (standard) or 176 to 264 volts ac (option 015).	HP 3445 AC/DC Range Unit. (Also performs functions of HP 3441A Range Selector listed above. Requires an HP 3449A Digital Voltmeter.
Variable Autotransformer	Capable of reducing ac mains input to computer to 80 volts ac (standard) or 160 volts ac (option 015); rated at least 1100 volt-amperes.	None.

1-23. TEST EQUIPMENT. Test equipment required to verify the adequacy of the ac mains voltage and the proper adjustments of the processor power supply are listed in table 1-4.

1-24. AC POWER MAINS OUTLET AND EXTERNAL GROUND

The female power outlet to be used to supply ac mains power to the processor must be checked by a qualified electrician to ensure that it furnishes the proper voltage for which the processor is configured. The outlet and its associated wiring and fuses (or circuit breakers) must be capable of carrying the current specified on the identification label on the processor rear panel. (See figure 1-1.)

Figures 1-7 and 1-8 illustrates and provides the necessary details of the various ac power cord configurations. If the processor is to be installed in a building, make sure that the local electrical code permits the use of the type of power cord furnished with the processor.

Have a qualified electrician check the power outlet with an ac voltmeter to ensure that the required single-phase voltage is present. If the processor is configured for 110-volt operation, the mains voltage must be in the range of 88 to 132 volts ac (rms); for 220-volt operation, the mains voltage must be in the range of 176 to 264 volts ac (rms). Bear in mind that the electrical load imposed by the processor and its options and accessories may reduce the line voltage below the no-load value.

If the line voltage is in the correct range, have the electrician also check the power outlet to ensure that it is wired correctly with respect to ac high potential, ac neutral, and earth ground. If the outlet is wired improperly, correction must be made by a qualified electrician. Local electrical codes must be observed if the installation is inside a building.

For safety reasons, it is *mandatory* that a connection be made between the processor chassis and earth ground. For installation in a mobile environment (e.g., ship, aircraft, or train), the earth ground wire in the processor ac power cord must be connected to the hull or metal frame of the vehicle.

1-25. PROCESSOR MOUNTING

1-26. BENCH MOUNTING. As stated in paragraph 1-5, the processor may be used as a freestanding instrument in a land-based environment. The only consideration here is that adequate space be allowed on each side to ensure full intake and exhaust of ventilating air. Bear also in mind that a minimum 12 inches (30.5 centimeters) of clearance behind the processor rear panel is required when removing and installing input/output interface PCA's.

1-27. RACK MOUNTING. The following chassis slide kits are available for rack mounting the processors:

PROCESSOR	CHASSIS SLIDE KIT
HP 2105A	HP 12903A
HP 2108A	HP 12903B

If a chassis slide kit has been ordered, mount the components to the sides of the processor and to the inside of the rack according to the instructions furnished with the kit. Then install the processor in the rack and secure the processor in place with screws inserted through the mounting holes identified in figures 1-2 and 1-3. The processor is light enough to allow installation in the rack without being supported by any means other than the rack-mounting screws.

1-28. POWER SUPPLY CHECK

Verify the tolerances of the various power supply voltages and the setting of the power fail threshold as described in following paragraphs.

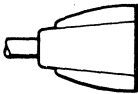
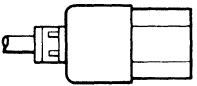
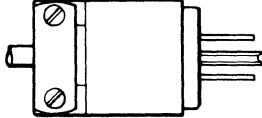
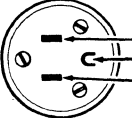
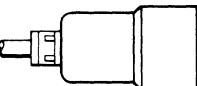
FEMALE HP (TOWER)   (N) LIGHT BLUE OR WHITE (E) GREEN/YELLOW OR GREEN (L) BROWN OR BLACK			MALE NEMA (MOLDED)   (N) WHITE (E) GREEN/YELLOW OR GREEN (L) BLACK	
FEMALE CEE   (L) BROWN OR BLACK (E) GREEN/YELLOW (N) LIGHT BLUE OR WHITE			MALE NEMA (HARD WIRED)   (N) WHITE (E) GREEN/YELLOW (L) BLACK	
MALE CEE   (L) BROWN OR BLACK (E) GREEN/YELLOW (N) LIGHT BLUE OR WHITE			E – EARTH OR SAFETY GROUND N – NEUTRAL OR IDENTIFIED CONDUCTOR L – LINE OR ACTIVE CONDUCTOR	
HP PART NUMBER	POWER CORD LENGTH		WIRE SIZE	CONNECTORS
8120-1406	2 1/2 ft.	(76 cm)	18/3	FEMALE HP (TOWER) to MALE CEE
8120-1396*	2 1/2 ft.	(76 cm)	18/3	FEMALE CEE to MALE CEE
8120-1900*	2 1/2 ft.	(76 cm)	16/3	FEMALE CEE to MALE CEE
8120-1625*	8.0 ft.	(2.4 m)	18/3	FEMALE CEE to MALE CEE
*USA OR NON-USA				
8120-1405	2 1/2 ft.	(76 cm)	18/3	FEMALE CEE to MALE NEMA (MOLDED)
8120-1348	7 1/2 ft.	(2.2 m)	18/3	FEMALE CEE to MALE NEMA (MOLDED)
8120-1395	8.0 ft.	(2.4 m)	18/3	FEMALE CEE to MALE NEMA (MOLDED)
8120-1407	15.0 ft.	(4.5 m)	18/3	FEMALE CEE to MALE NEMA (MOLDED)
8120-1933	2 1/2 ft.	(76 cm)	16/3	STRIPPED ENDS to MALE CEE
8120-1755	4.0 ft.	(1.22 m)	18/3	STRIPPED ENDS to MALE CEE
8120-1934	4.0 ft.	(1.22 m)	16/3	STRIPPED ENDS to MALE CEE
8120-1706	15.0 ft.	(4.5 m)	14/3	STRIPPED ENDS to MALE NEMA (HARD WIRED)
8120-1935	12.0 ft.	(3.6 m)	16/3	STRIPPED ENDS to MALE NEMA (HARD WIRED)
8120-1796	8.0 ft.	(2.4 m)	18/3	FEMALE CEE to MALE NEMA (HARD WIRED)
8120-1931	8.0 ft.	(2.4 m)	16/3	FEMALE CEE to MALE NEMA (HARD WIRED)
8120-1932	12.0 ft.	(3.6 m)	16/3	FEMALE CEE to MALE NEMA (HARD WIRED)
NOTE: OTHER COUNTRIES SUCH AS CANADA, JAPAN (100 or 200 VOLTS), MEXICO, PHILLIPPINES, AND TAIWAN MAY USE SOME OF THE ABOVE SETS. CONSULT YOUR NEAREST HP SALES OFFICE.				

Figure 1-7. AC Power Cord Sets (USA)

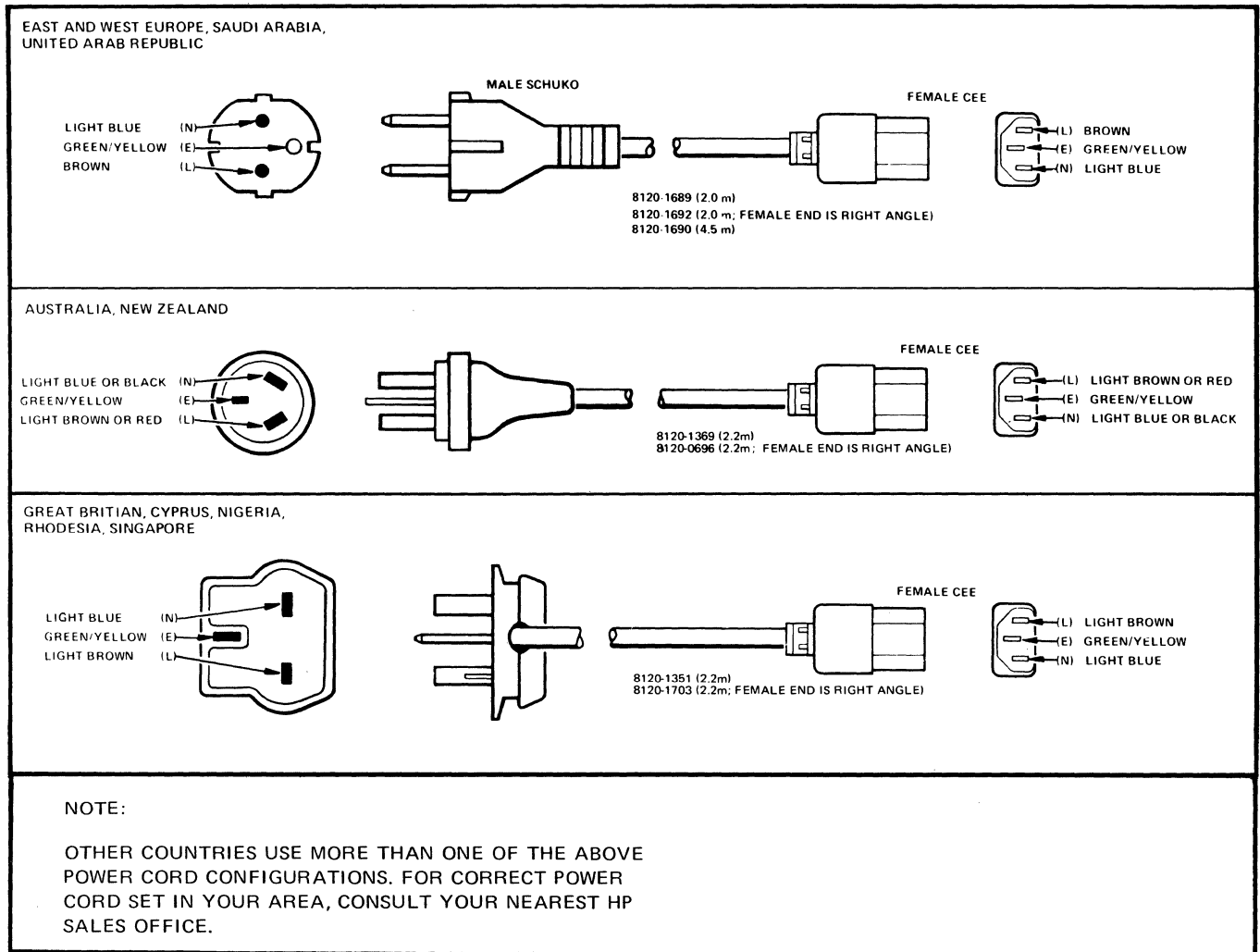


Figure 1-8. AC Power Cord Sets (Non-USA)

1-29. POWER SUPPLY ACCURACY. Energize the digital voltmeter and allow sufficient warmup to reach its rated accuracy. Plug the processor power cord into the power outlet and proceed as follows:

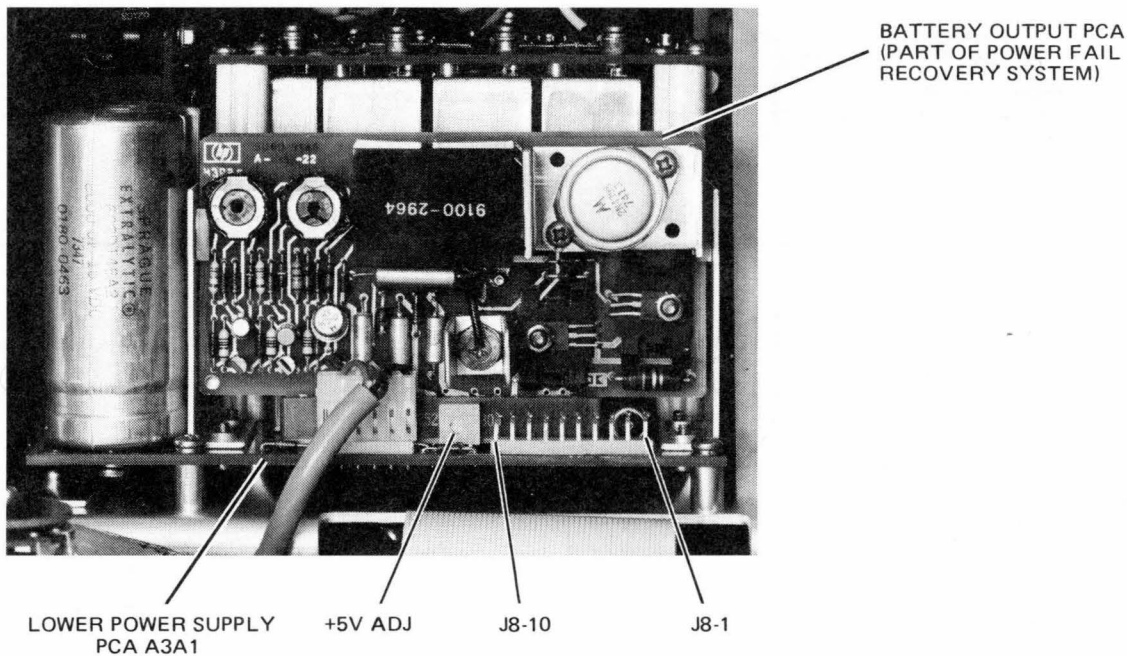
- a. Loosen the two quarter-turn fasteners on operator panel and lower it to the access position.

WARNING

Hazardous voltages are exposed when the power supply shield is removed.

- b. Remove the three screws and lockwashers securing the front power supply shield to the processor mainframe.

- c. Disconnect key-operated switch assembly cable from lower power supply PCA connector and remove the front power supply shield. Reconnect key-operated switch assembly cable.
- d. On processor rear panel, set ~LINE switch to ON.
- e. On operator panel, rotate key-operated switch to R (reset) and then to OPERATE.
- f. Connect positive lead of digital voltmeter to J8-5 (+5V test point) and connect common lead to J8-2 (common test point). (See Figure 1-9.)
- g. Adjust +5V ADJ potentiometer to obtain voltmeter indication of $+5.00 \pm 0.05$ volts.
- h. Check tolerances of the remaining supplies; test points and tolerances are listed in table 1-5.
- i. Set key-operated switch to STANDBY and set ~LINE switch to OFF.



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Figure 1-9. Power Supply Field Adjustment and Voltage Test Points

Table 1-5. Power Supply Voltage Tolerances

SUPPLY	TEST POINT*	TOLERANCE
-12V	J8-1	$\pm 0.6V$
Common	J8-2	—
+12V	J8-3	$\pm 0.6V$
-2V	J8-4	$\pm 0.1V$
+5V	J8-5	$\pm 0.25V$
+5V(M)	J8-6	$\pm 0.25V$
V+(BAT)	J8-7	—
PWU	J8-8	—
+12V(M)	J8-9	$\pm 0.6V$
-12V(M)	J8-10	$\pm 0.6V$
*J8 is mounted on the lower power supply PCA (A3A1).		

Note: If one or more power supplies are out of tolerance, notify the nearest Hewlett-Packard Sales and Service Office. A list of Sales and Service Offices are provided at the rear of this manual.

1-30. POWER-UP THRESHOLD. The processor is shipped with the power-up threshold set at the lower limit of the mains voltage configuration. That is, if the processor is configured for 110-volt operation, the power-up threshold is set at 88 volts rms; if the processor is configured for 220-volt operation, the power-up threshold is set at 176 volts rms. If one or more peripheral devices in the computer system will not operate properly when the mains voltage drops below say 100 volts rms (standard) or 200 volts rms (option 015), it may be necessary to raise the power-up threshold to this level. Verify and, if desired, re-adjust the power-up threshold as follows:

- j. Disconnect voltmeter and key-operated switch assembly cable. Replace front power supply shield and reconnect key-operated switch assembly cable.
- k. Replace operator panel assembly and tighten the two quarter-turn screws.

WARNING

Hazardous voltages are exposed when the top cover is removed and ac power is applied.

CAUTION

The following procedure will cause the computer to power fail and, if a power fail recovery system is not installed, all contents of memory will be lost.

- a. Loosen the screw in the rear center fold of the top cover. Slide top cover rearward approximately 6 inches (15 centimeters) to access the power-up threshold potentiometer. (See detail A in Figures 3-1 and 3-2.)
- b. Energize ac voltmeter and allow sufficient warm-up to reach its rated accuracy.
- c. Connect ac voltmeter leads across autotransformer output. Plug autotransformer power cord into power outlet and set its output to approximately 110 volts rms (standard) or 220 volts rms (option 015).
- d. Plug processor power cord into autotransformer power output receptacle. Set processor ~LINE switch to ON and rotate key-operated switch to R (reset) and then to OPERATE.
- e. Slowly reduce autotransformer output until all operator panel indicators extinguish, indicating that the processor has switched automatically to the standby mode. The voltmeter should indicate 75 ± 5 volts rms (standard) or 150 ± 10 volts rms (option 015).
- f. If a power fail recovery system is installed, omit this step. If a power fail recovery system is not installed:
 - (1) Set autotransformer output to 85 ± 0.1 volts rms (standard) or 170 ± 0.2 volts rms (option 015). Rotate key-operated switch to R (reset) and then to OPERATE. Operator panel indicators should remain extinguished.
 - (2) Set autotransformer output to 87 ± 0.1 volts rms (standard) or 174 ± 0.2 volts rms (option 015). Rotate key-operated switch to R (reset) and then to OPERATE. Operator panel indicators should light. Proceed with step h.

Note: There is up to a 1-second delay from the time that the upper threshold is detected until the operator panel indicators light. Perform the following step very carefully.

- g. *Slowly* increase autotransformer output until the operator panel indicators light. The voltmeter should indicate 87 ± 0.5 volts rms (standard) or 174 ± 1.0 volts rms (option 015).

- h. If the upper threshold is not within tolerance, or if it is desired to adjust both thresholds to a higher voltage, continue with step i. Otherwise, disconnect the test setup and continue with the installation.
- i. Reduce autotransformer output until operator panel indicators extinguish. Set power-up threshold potentiometer fully clockwise.
- j. Set autotransformer output to the desired upper threshold. Adjust power-up threshold potentiometer *slowly* counterclockwise until operator panel indicators light.
- k. *Slowly* decrease autotransformer output until operator panel indicators extinguish. The ac voltmeter should indicate 10 to 20 volts lower than the desired upper threshold.

After verifying that the power-up threshold has been properly adjusted, disconnect the test setup, set the ~LINE switch to OFF, and close the top panel.

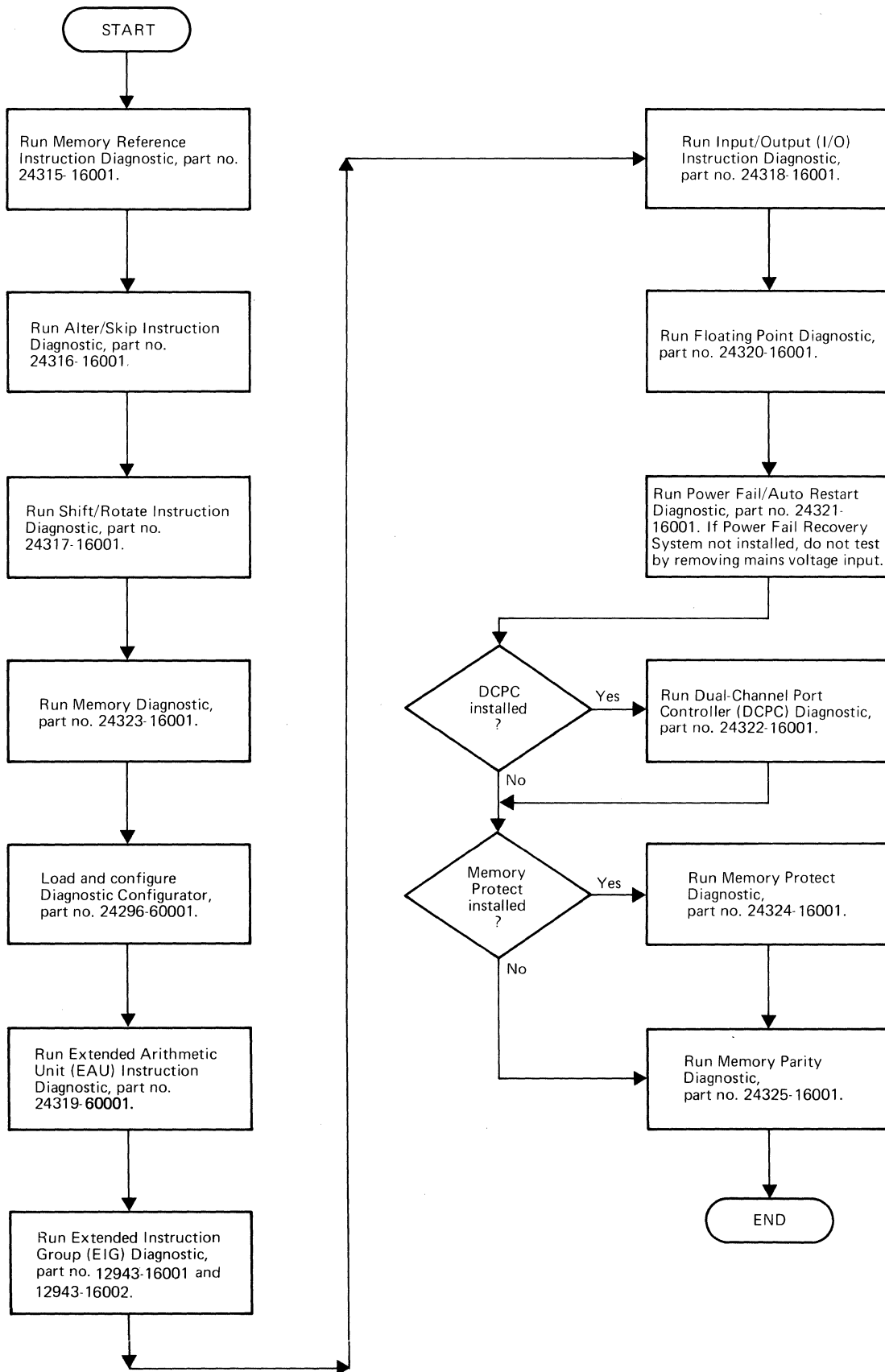
Note: The difference between the upper and lower thresholds varies with the computer configuration. A more heavily loaded computer configuration will change to standby at a higher line voltage than a less heavily loaded configuration, even though both configurations change from standby to operate at the same line voltage.

1-31. INTERFACE CABLING

Cable requirements to interconnect interface PCA's and associated peripherals are specified in the appropriate interface kit or subsystem documentation. After all interface cables have been assembled, set the key-operated switch to STANDBY; disconnect the battery cable (if present) from the BAT. INPUT connector and remove the input/output PCA cage cover. Install the hooded connector of each cable onto the edge connector of the PCA's as shown in figures 1-4 and 1-5. Connect the opposite end of each cable to the appropriate peripheral device, replace the I/O PCA cage cover, and reconnect the battery cable (if present). Set the key-operated switch to OPERATE.

1-32. PERFORMANCE VERIFICATION CHECK

Verify the system installation and operation by running the diagnostic tapes in the sequence given in figure 1-10. A description of the diagnostic program procedures associated with each tape is given in the following reference manuals in the *Manual of Diagnostics*:



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Figure 1-10. Performance Verification Check

<u>DIAGNOSTIC</u>	<u>MANUAL</u>	<u>TAPE</u>
Mem. Ref. Inst.	02100-90218	24315-16001
Alter/Skip Inst.	02100-90211	24316-16001
Shift/Rotate Inst.	02100-90212	24317-16001
Memory	02100-90219	24323-16001
Ext. Arith. Unit	02100-90214	24319-16001
Ext. Inst. Group	12943-90004	12943-16001,2
Input/Output Inst.	02100-90213	24318-16001
Floating Point	02100-90215	24320-16001
Power Fail/Auto Restart	02100-90216	24321-16001
DMA/DCPC	02100-90217	24322-16001
Memory Protect	02100-90220	24324-16001
Memory Parity	02100-90221	24325-16001

1-33. CLAIMS PROCEDURE

If the shipment is incomplete or if the equipment is damaged or fails to meet specifications, notify the nearest Hewlett-Packard Sales and Service Office. If damage occurred in transit, notify the carrier also. Hewlett-Packard will arrange for replacement or repair without waiting for settlement of claims against the carrier. In the event of damage in transit, retain the packing carton and packaging materials for inspection.

1-34. REPACKAGING FOR SHIPMENT

CAUTION

When shipping an HP 2108A Processor with a power fail recovery system installed, secure the battery PCA's in place with either a foam-plastic shipping block or with masking tape.

1-35. SHIPMENT USING ORIGINAL PACKAGING

The same containers and materials used in factory packaging can be used for reshipment of the processor. Alternatively, containers and packing materials may be obtained from Hewlett-Packard Sales and Service Offices. If the processor is being sent to the factory for servicing, attach a tag to the processor specifying the type of service required together with the processor model number and full serial number. Mark the container "FRAGILE" to ensure careful handling. In any subsequent correspondence, refer to the processor by model number and full serial number.

1-36. SHIPMENT USING NEW PACKAGING

The following instructions should be used as a guide when packaging the processor with commercially available materials:

- a. Wrap processor in heavy paper or sheet plastic. If shipping the processor back to the factory, first attach a tag to the processor with the return address and indicating the type of service required. Include the processor model number and full serial number.
- b. Use a strong shipping container. A double-wall carton constructed of 350-pound test material is adequate.
- e. Use sufficient shock-absorbing material on all sides of the processor to provide a firm cushion and to prevent movement inside the container. Use particular care to protect the processor corners and front and rear panels.
- d. Seal the shipping container securely and mark it "FRAGILE".
- e. In any subsequent correspondence with the factory, refer to the processor by model number and full serial number.

This section includes a simple troubleshooting flow-chart for isolating malfunctions to the subassembly level; procedures for removing and replacing the various computer subassemblies; and a listing of the backplane signal sources and destinations, signal mnemonics, and mnemonic definitions. Also included are an input/output timing diagram, a simplified block diagram, and a power distribution diagram.

2-1. TROUBLESHOOTING

Computer malfunctions can be isolated to the subassembly level by performing in sequence the procedure presented in figure 2-1. When a malfunction is encountered, replace the first suspect subassembly and repeat that portion of the procedure where the malfunction occurred. (Subassembly removal and replacement procedures are given in following paragraphs.) If the malfunction persists, reinstall the original subassembly, replace the next suspect subassembly, and again repeat the procedure. After the malfunction is cleared, contact the nearest Hewlett-Packard Sales and Service Office for instructions regarding shipment of the defective subassembly.

Attach a tag to the defective subassembly identifying the owner and specifying the type of malfunction. Include the model number and full serial number of your processor. Pack the defective subassembly in the packaging removed from the replacement subassembly. Seal the shipping package and mark it "FRAGILE" to ensure careful handling.

2-2. SUBASSEMBLY REMOVAL AND REPLACEMENT

WARNING

Hazardous voltages are present inside the processor mainframe. Use extreme care when working around the power supply area. Heed all WARNING — HAZARDOUS VOLTAGE labels.

The following paragraphs, which describe procedures for removing and replacing the various processor and memory system subassemblies shown in Figures 3-1 and 3-2, assume that the processor is installed as a freestanding device. If the processor is rack mounted, read the entire subassembly removal procedure and refer to Figures 3-1 or 3-2 as appropriate. When it is

obvious that the procedure cannot be performed with the processor in the rack, proceed as follows:

- On the rear panel, set BATTERY and ~LINE switches of OFF; disconnect power cord.
- Disconnect all I/O cables, including the I/O extender cable if present.
- Remove processor from rack.

2-3. TOP, SIDE, AND BOTTOM COVERS

WARNING

Hazardous voltages are exposed when the covers are removed and ac power applied.

2-4. REMOVAL. Remove the top, side, and bottom cover as follows:

- Loosen screw located in rear fold of top cover. Slide top cover toward rear and remove.
- Remove chassis slide(s) from side cover(s) if present. Loosen screw located in rear fold of side cover and slide cover toward rear and remove.
- Remove all I/O cables, including I/O extender cable if present. Loosen screw located in rear fold of bottom cover and slide cover toward rear and remove.

2-5. REPLACEMENT. Replace covers in the reverse order of the removal procedure.

2-6. CONTROL STORE ROM PCA'S

2-7. REMOVAL. Remove bottom cover and proceed as follows:

- Remove the three screws and lockwashers securing ROM PCA 3 to CPU PCA. Carefully disconnect ROM PCA 3 from ROM PCA 2 and remove.
- Remove the three screws and lockwashers securing ROM PCA 2 to CPU PCA. Carefully disconnect ROM PCA 2 from ROM PCA 1 and remove.
- Disconnect ROM connector assembly from ROM PCA 1 and CPU PCA. Remove the three screws and lockwashers securing ROM PCA 1 to CPU PCA and remove.

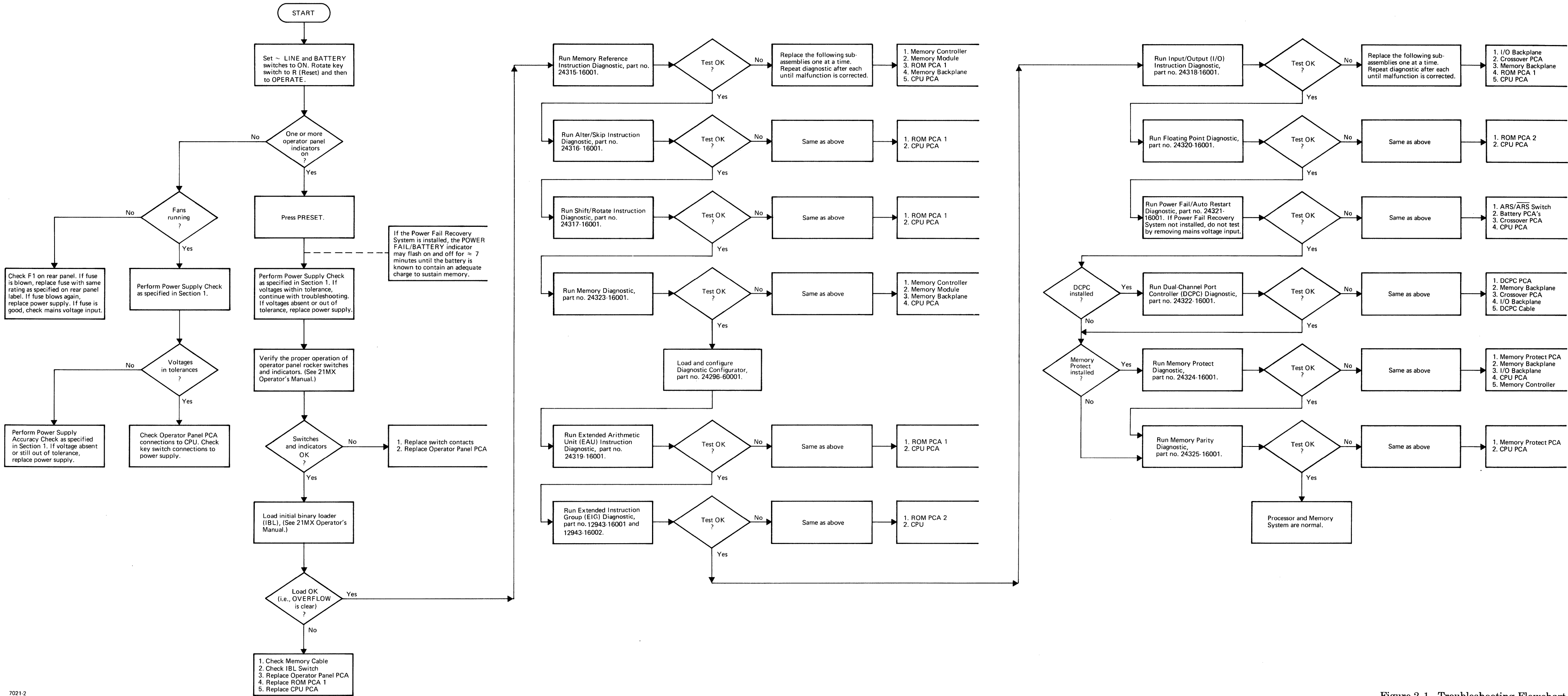


Figure 2-1. Troubleshooting Flowchart

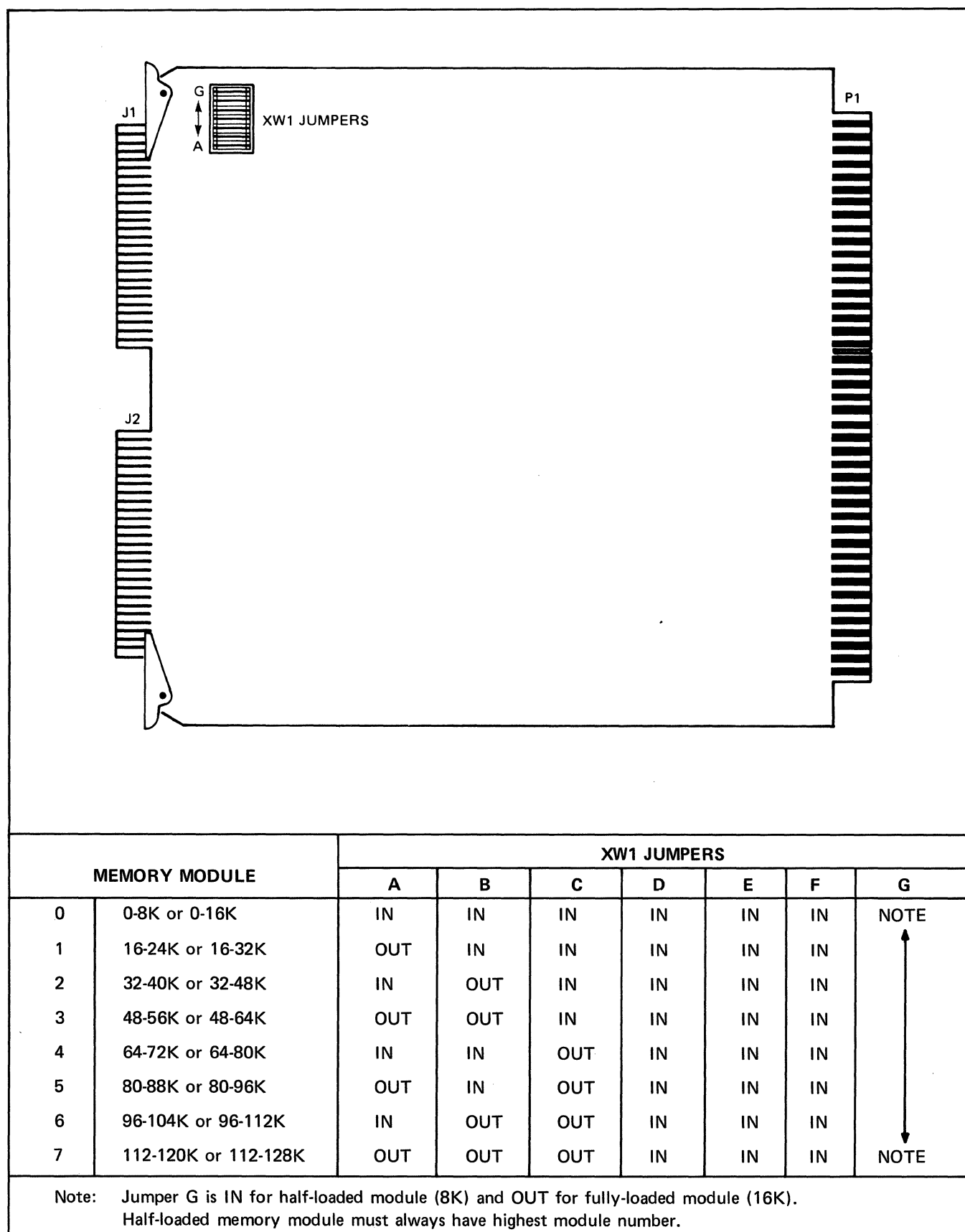
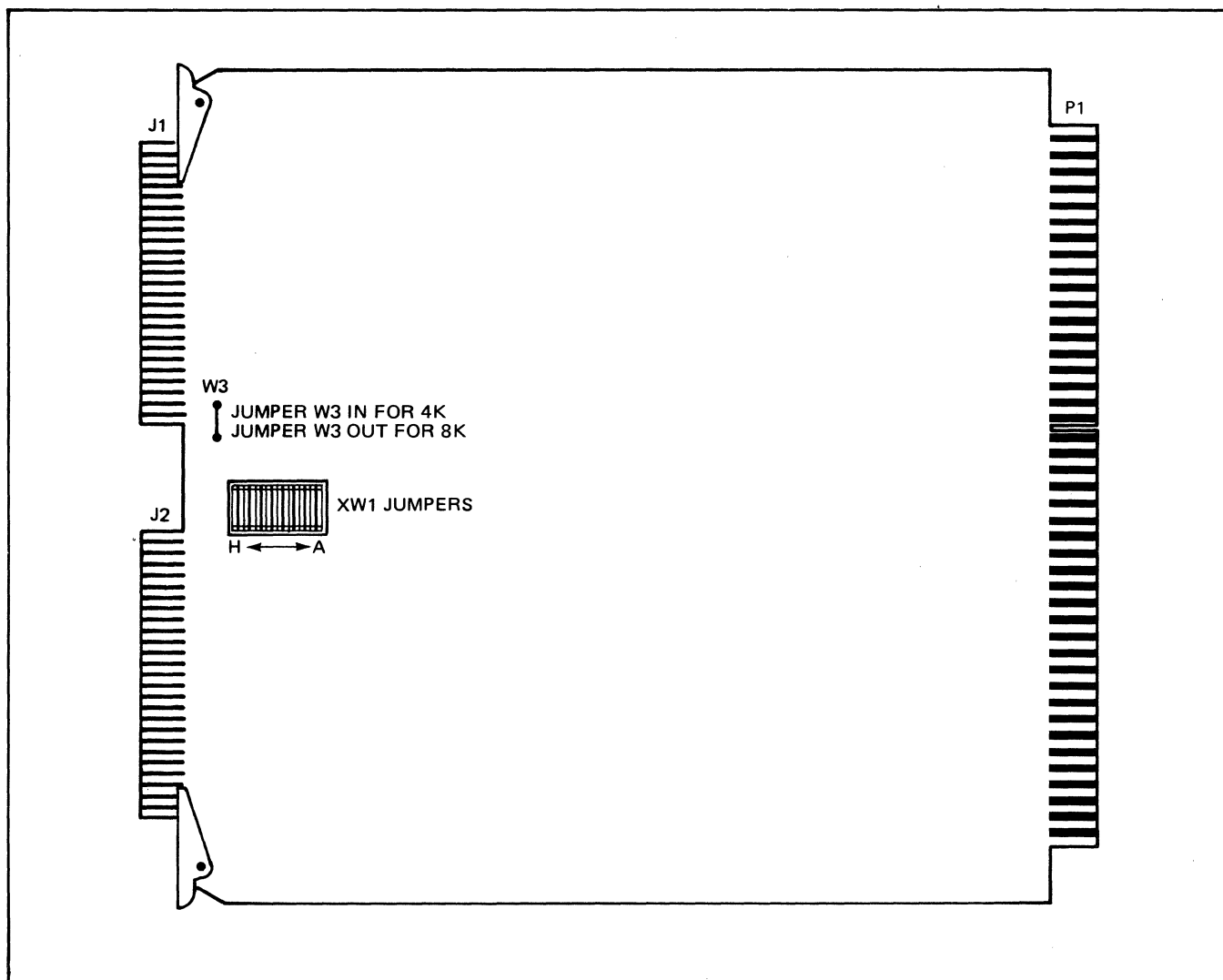


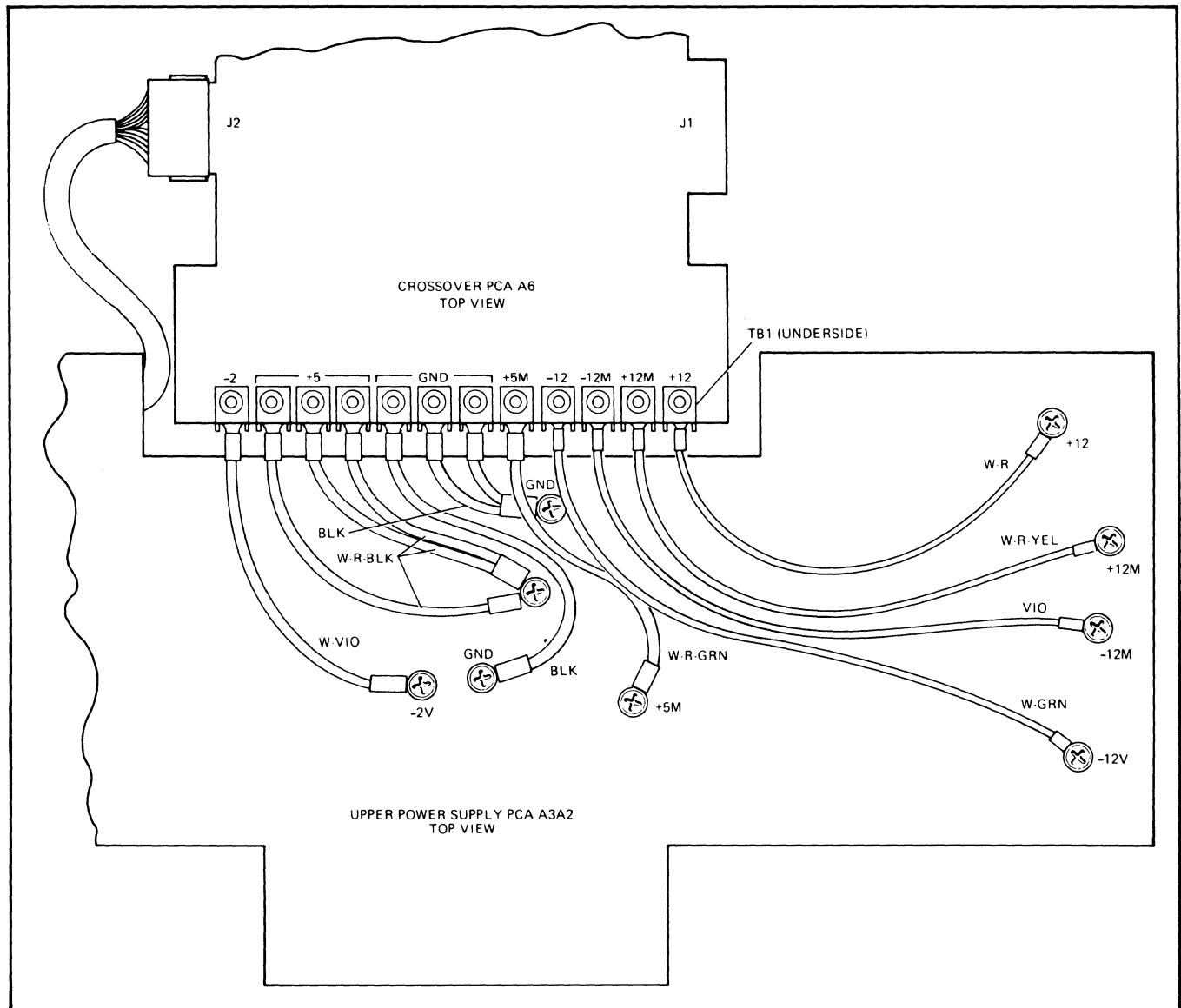
Figure 2-4. HP 2101A Memory Module Address Jumpers



MEMORY MODULE		W3	XW1 JUMPERS							
			A	B	C	D	E	F	G	H
0	0-4K	IN	IN	IN	IN	IN	IN	IN	IN	IN
0	0-8K	OUT	OUT	IN	IN	IN	IN	IN	IN	IN
1	8-12K	IN	IN	OUT	IN	IN	IN	IN	IN	IN
1	8-16K	OUT	OUT	OUT	IN	IN	IN	IN	IN	IN
2	16-24K	OUT	OUT	IN	OUT	IN	IN	IN	IN	IN
3	24-32K	OUT	OUT	OUT	OUT	IN	IN	IN	IN	IN
4	32-40K	OUT	OUT	IN	IN	OUT	IN	IN	IN	IN
5	40-48K	OUT	OUT	OUT	IN	OUT	IN	IN	IN	IN
6	48-56K	OUT	OUT	IN	OUT	OUT	IN	IN	IN	IN
7	56-64K	OUT	OUT	OUT	OUT	OUT	IN	IN	IN	IN

Note: Half-loaded memory module (i.e., 4K) must always be highest module number.

Figure 2-5. HP 2102A Memory Module Address Jumpers



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Figure 2-6. Crossover PCA Power Connections

2-25. REPLACEMENT. Install the crossover PCA as follows:

- Slide spade lug of each wire under washer of appropriate connection point on terminal block and tighten screw.
- Position crossover PCA with receptacles A6XA4 and A6XA5 in contact with I/O backplane connectors.
- Press inward on back of A6XA4 and A6XA5 to seat backplanes fully into crossover PCA receptacles. Secure crossover PCA and PCA cage covers using the four screws and lockwashers.
- Connect DCPC cable assembly (if used) to edge connector J1. Connect power supply cable assembly to J2.
- Replace processor top cover.

2-26. MEMORY AND I/O BACKPLANES

2-27. REMOVAL. Remove the memory and I/O backplanes from the processor mainframe as follows:

- Remove top cover and disconnect DCPC cable assembly (if used) from crossover PCA edge connector J1.
- Withdraw all memory PCA's approximately 2 inches (5 centimeters) to clear rear connectors from memory backplane receptacles.
- Withdraw all I/O interface PCA's approximately 2 inches (5 centimeters) to clear rear connectors from I/O backplane receptacles.

- d. Remove the four screws and lockwashers securing crossover PCA to PCA cage covers. Carefully lift crossover PCA to free it from backplane edge connectors; bend crossover PCA back to access memory and I/O backplanes.
- e. Grasp memory backplane and lift up and out of memory PCA cage assembly.
- f. Grasp I/O backplane and lift up and out of I/O PCA cage assembly.

2-28. REPLACEMENT. Replace the memory and I/O backplanes in reverse order of the removal procedure. Be sure to reconnect DCPC cable assembly (if used) after all PCA's have been seated firmly into their mating receptacles. Note markings on backplanes to ensure proper orientation.

2-29. POWER FAIL RECOVERY SYSTEM

2-30. BATTERY REMOVAL. Set the BATTERY switch to OFF and disconnect the battery cable from the BAT. INPUT connector. Remove the four screws and lockwashers securing the cover to the battery housing. Remove the battery assembly.

2-31. BATTERY PCA REMOVAL. Slide the processor top cover back to access the battery PCA's. Grasp battery output PCA and pull upward out of the battery board guides. Remove battery control I PCA and the battery control II PCA in the same manner as indicated for the battery output PCA.

2-32. REPLACEMENT. Replace the battery and the battery PCA's in the reverse order of the removal procedures.

2-33. POWER SUPPLY

WARNING

Hazardous voltages are present with the ac power cord connected. Ensure that ac power cord is disconnected before proceeding.

2-34. REMOVAL. Remove the top cover and the crossover PCA and proceed as follows:

- a. Loosen the two quarter-turn screws and lower operator panel to access position.
- b. Remove the three screws and lockwashers securing front power supply shield to processor mainframe.

- c. Disconnect key-operated switch assembly cable from lower power supply PCA.
- d. Remove I/O PCA cage cover and loosen I/O PCA retainer; slide retainer to the right.
- e. Remove the four screws and lockwashers securing rear panel to processor mainframe.
- f. Disconnect battery cable assembly from upper power supply PCA.
- g. Remove the eight long screws and lockwashers securing upper power supply PCA to processor mainframe.
- h. Remove battery output PCA.
- i. Remove the two screws and lockwashers securing lower power supply PCA to processor mainframe.
- j. Disconnect power supply cable assembly from crossover PCA.
- k. Disconnect ac power cable assembly from lower power supply PCA.
- l. Lift power supply up and out of processor mainframe.

2-35. REPLACEMENT. Replace the power supply in reverse order of the removal procedure.

2-36. VENTILATING FANS

2-37. REMOVAL. Remove the processor top, bottom, and left side covers and proceed as follows:

- a. On the HP 2105A, unsolder the two power leads at the bottom of the fan(s).
- b. On the HP 2108A, disconnect the two power leads at the top of the fan(s).
- c. On the HP 2105A, remove the seven screws and lockwashers securing top left side frame to processor mainframe. Remove the seven screws and lockwashers securing bottom left side frame to processor mainframe.
- d. On the HP 2108A, remove the 14 screws securing left side frame to processor mainframe.
- e. Remove the four self-tapping screws securing fan to processor mainframe. Pull fan upward and out of the mainframe.

2-38. REPLACEMENT. Replace the ventilating fan(s) in reverse order of the removal procedure.

2-39. 110/220 VAC RECONFIGURATION

To reconfigure the processor to operate from 220-volts main instead of 110-volt mains (or vice versa), refer to figure 2-9 and proceed as follows:

WARNING

Hazardous voltages are present inside the processor mainframe!! Before changing from 110V ac to 220V ac configuration, or vice versa, set ~LINE and battery switches to OFF and disconnect the power cord!! Failure to observe this precaution can result in serious injury or death!!

- Set ~LINE and BATTERY switches to OFF and remove power cord.
- Remove top cover of processor.
- Remove the four mounting screws and lock-washers that secure voltage distribution panel to processor frame. (Two screws are located at the top of the panel and two screws are located at the bottom of the panel.)
- Carefully swing voltage distribution panel outward to expose terminal block TB1 and other components.
- For 110V ac operation, connect a jumper wire between the WHT-YEL-GRA and WHT-BLU-GRA lead wires on terminal block. Connect one side of each fan to the WHT-BRN-GRA lead wire on terminal block; connect other side of each fan to the WHT-BLU-GRA lead wire on terminal block. Replace fuse F1 with the type and rating specified in table 3-1 (HP 2105A) or table 3-2 (HP 2108A).
- For 220V ac operation, remove jumper wire between the WHT-YEL-GRA and WHT-BLU-GRA lead wires on terminal block. Connect one fan across the WHT-BRN-GRA and WHT-YEL-GRA lead wires; connect other fan across the WHT-YEL-GRA and WHT-BLU-GRA lead wires. Replace fuse F1 with the type and rating specified in table 3-1 (HP 2105A) or table 3-2 (HP 2108A).

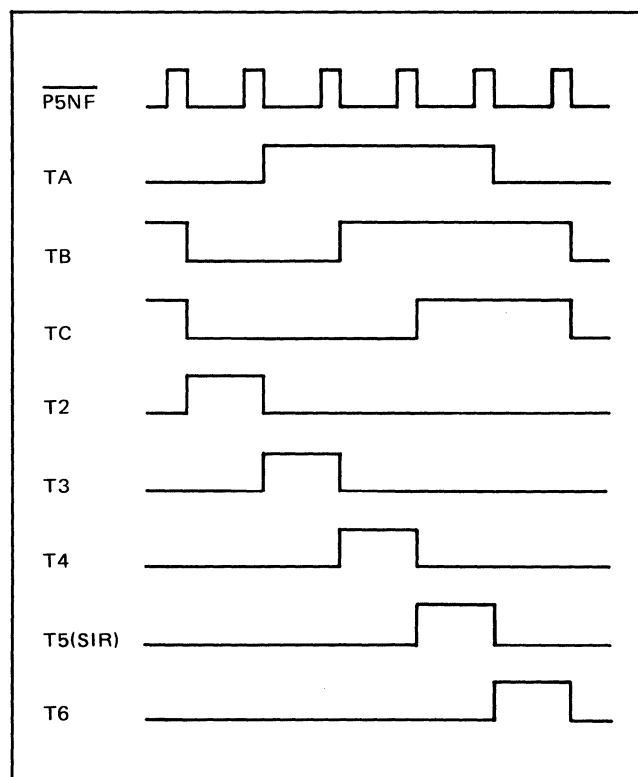
- Position voltage distribution panel in place and secure with the four mounting screws and lock-washers. Replace top cover of processor.

2-40. BACKPLANE SIGNALS

Table 2-1 is a listing of signals transferred to and from the various computer subassemblies. The reference number appearing to the right of the signal definition are cross-indexes to the signal distribution listing provided in table 2-2. Table 2-2 lists these signals in alphanumeric order and indicates both the signal source and signal destination.

2-41. DIAGRAMS

Figure 2-7 is the input/output timing diagram and figure 2-8 is a simplified block diagram of the HP 21MX Computer. The power distribution diagram is provided in figure 2-9.



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Figure 2-7. Input/Output Timing

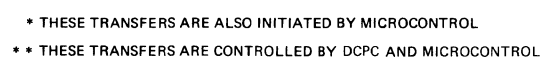


Figure 2-8. HP 21MX Computer Simplified Block Diagram

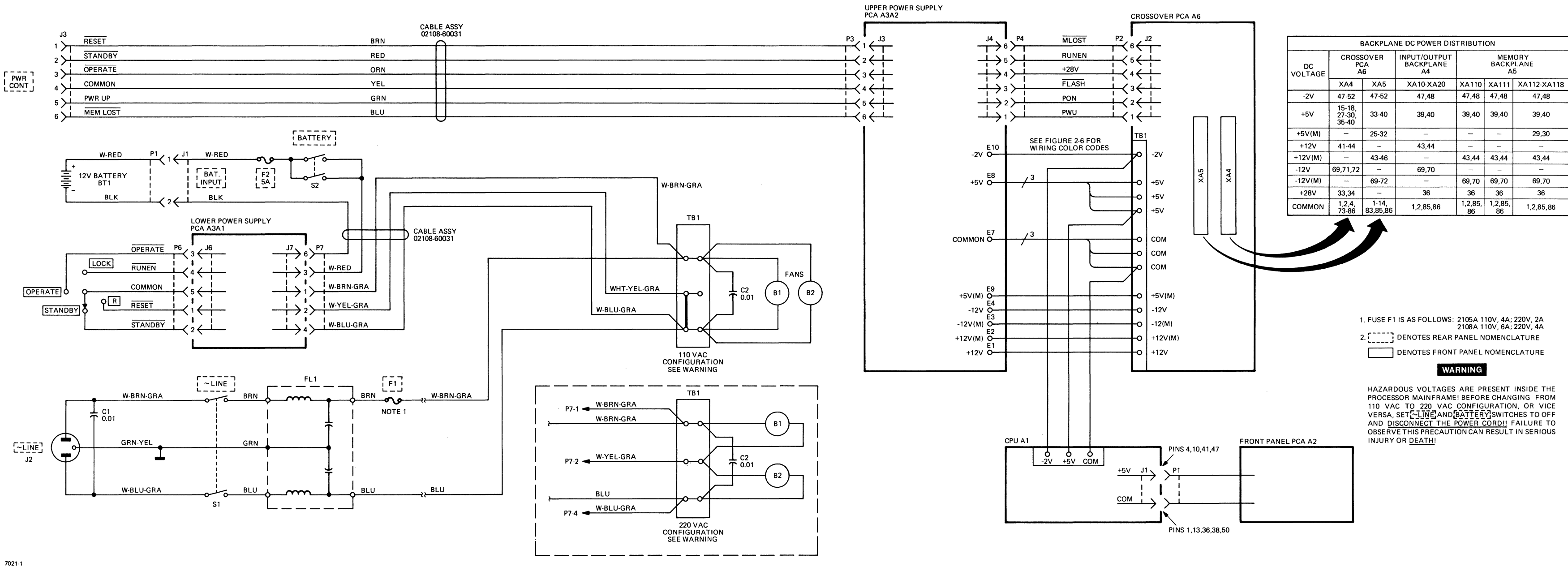


Figure 2-9. Power Distribution Diagram

Table 2-1. Signal Name Index

SIGNAL MNEMONIC	DEFINITION	REF NO.
CLC	Clear Control	1
CLF	Clear Flag	2
CLKX	Clock, External	3
CLXEN	Clock, External, Enable	4
CRS	Control Reset	5
CTL5	"Not" Control 5	6
DECM	"Not" Decrement M-register	7
DIEN	"Not" Display Enable	8
DISPLAY	"Not" Display	9
DIST	"Not" Display Store	10
DMACYC	"Not" DMA Cycle	11
DMAEN	"Not" DMA Enable	12
DMAFRZ	"Not" DMA Freeze	13
DMAIOI	"Not" DMA I/O Input	14
DMAIOO	"Not" DMA I/O Output	15
DMALCH	"Not" DMA Latch	16
DMALO	"Not" DMA Lockout	17
DMAREAD	"Not" DMA Read	18
DMARQ1	"Not" DMA Request 1	19
DMARQ2	"Not" DMA Request 2	20
DSPCL	"Not" Display Clear	21
DSPEN	"Not" Display Enable	22
DSPST	"Not" Display Store	23
EDT	End Data Transfer	24
ENF	Enable Flag	25
ENRMX	Enable ROM, External	26
EXFF	Extend Flip-Flop	27
FPSP	Front Panel Special	28
FRZFF	Freeze Flip-Flop	29
FTCH	"Not" Fetch	30
FLASH	"Not" Flash	31
FLG1	Flag bit 1	32
FLG2	Flag bit 2	33
FLG5	"Not" Flag s.c. 5 (memory protect)	34
HLTB	Halt Button	35
HLTPE	"Not" Halt Parity Error	36
IAK	Interrupt Acknowledge	37
IA0	"Not" Interrupt Address bit 0	38
IA1	"Not" Interrupt Address bit 1	39

Table 2-1. Signal Name Index (Continued)

SIGNAL MNEMONIC	DEFINITION	REF NO.
$\overline{IA2}$	"Not" Interrupt Address bit 2	40
$\overline{IA3}$	"Not" Interrupt Address bit 3	41
$\overline{IA4}$	"Not" Interrupt Address bit 4	42
$\overline{IA5}$	"Not" Interrupt Address bit 5	43
$\overline{IBL}$	"Not" Initial Binary Loader	44
IEN5	Interrupt Enable s.c. 5	45
IEN10	Interrupt Enable s.c. 10	46
IEN20	Interrupt Enable s.c. 20	47
$\overline{INCI}$	"Not" Indirect Counter Increment	48
$\overline{INCM}$	"Not" Increment M-register	49
$\overline{INSTEP}$	"Not" Instruction Step	50
INTL	Interrupt Light	51
$\overline{INTX}$	"Not" Interrupt, External	52
IOB0	Input/Output Bus bit 0	53
IOB1	Input/Output Bus bit 1	54
IOB2	Input/Output Bus bit 2	55
IOB3	Input/Output Bus bit 3	56
IOB4	Input/Output Bus bit 4	57
IOB5	Input/Output Bus bit 5	58
IOB6	Input/Output Bus bit 6	59
IOB7	Input/Output Bus bit 7	60
IOB8	Input/Output Bus bit 8	61
IOB9	Input/Output Bus bit 9	62
IOB10	Input/Output Bus bit 10	63
IOB11	Input/Output Bus bit 11	64
IOB12	Input/Output Bus bit 12	65
IOB13	Input/Output Bus bit 13	66
IOB14	Input/Output Bus bit 14	67
IOB15	Input/Output Bus bit 15	68
IOB16	Input/Output Bus bit 16	69
IOG	Input/Output Group	70
$\overline{IOGSP}$	"Not" Input/Output Group, Special	71
IOI	I/O Input	72
IOO	I/O Output	73
IRQ0	Interrupt Request bit 0	74
IRQ1	Interrupt Request bit 1	75
IRQ2	Interrupt Request bit 2	76
IRQ3	Interrupt Request bit 3	77
IRQ4	Interrupt Request bit 4	78

Table 2-1. Signal Name Index (Continued)

SIGNAL MNEMONIC	DEFINITION	REF NO.
IRQ5	Interrupt Request bit 5	79
IRQ6	Interrupt Request bit 6	80
IRQ7	Interrupt Request bit 7	81
<u>IRSTF</u>	"Not" Instruction Register Store	82
<u>LEFT</u>	"Not" Left	83
<u>LEGAL</u>	"Not" Legal	84
<u>MBEN</u>	"Not" Memory Bus Enable	85
MB0	Memory Bus bit 0	86
MB1	Memory Bus bit 1	87
MB2	Memory Bus bit 2	88
MB3	Memory Bus bit 3	89
MB4	Memory Bus bit 4	90
MB5	Memory Bus bit 5	91
MB6	Memory Bus bit 6	92
MB7	Memory Bus bit 7	93
MB8	Memory Bus bit 8	94
MB9	Memory Bus bit 9	95
MB10	Memory Bus bit 10	96
MB11	Memory Bus bit 11	97
MB12	Memory Bus bit 12	98
MB13	Memory Bus bit 13	99
MB14	Memory Bus bit 14	100
MB15	Memory Bus bit 15	101
<u>MEBEN</u>	"Not" Memory Expansion Bus Enable	102
MEB10	Memory Expansion Bus bit 10	103
MEB11	Memory Expansion Bus bit 11	104
MEB12	Memory Expansion Bus bit 12	105
MEB13	Memory Expansion Bus bit 13	106
MEB14	Memory Expansion Bus bit 14	107
MEB15	Memory Expansion Bus bit 15	108
MEB16	Memory Expansion Bus bit 16	109
MEB17	Memory Expansion Bus bit 17	110
MEB18	Memory Expansion Bus bit 18	111
MEB19	Memory Expansion Bus bit 19	112
<u>MECND</u>	"Not" Memory Expansion Conditional	113
<u>MEEN</u>	"Not" Memory Expansion Enable	114
<u>MESP</u>	"Not" Memory Expansion Special	115
<u>MEST</u>	"Not" Memory Expansion Store	116
<u>MEV</u>	"Not" Memory Expansion Violation	117

Table 2-1. Signal Name Index (Continued)

SIGNAL MNEMONIC	DEFINITION	REF NO.
$\overline{\text{MLOST}}$	"Not" Memory Lost	118
$\overline{\text{MPCND}}$	"Not" Memory Protect Conditional	118A
$\overline{\text{MPCK}}$	"Not" Memory Protect Check	119
$\overline{\text{MPINTON}}$	"Not" Memory Protect Interrupt On	120
$\overline{\text{MPV}}$	"Not" Memory Protect Violation	121
MSRDY	Memory Soon Ready	122
OVERFF	Overflow Flip-Flop	123
PARFF	Parity Flip-Flop	124
$\overline{\text{PE}}$	"Not" Parity Error	125
PF	Power Fail	126
PON	Power On	127
POPIO	Power On Preset I/O	128
PRH6	Priority High s.c. 6	129
PRH10	Priority High s.c. 10	130
PRL4/PRH5	Priority Low s.c. 4/Priority High s.c. 5	131
PRL7	Priority Low s.c. 7	132
PRL10/PRH11	Priority Low s.c. 10/Priority High s.c. 11	133
PRL11/PRH12	Priority Low s.c. 11/Priority High s.c. 12	134
PRL12/PRH13	Priority Low s.c. 12/Priority High s.c. 13	135
PRL13/PRH14	Priority Low s.c. 13/Priority High s.c. 14	136
PRL14/PRH15	Priority Low s.c. 14/Priority High s.c. 15	137
PRL15/PRH16	Priority Low s.c. 15/Priority High s.c. 16	138
PRL16/PRH17	Priority Low s.c. 16/Priority High s.c. 17	139
PRL17	Priority Low s.c. 17	140
PRSTB	Preset Button	141
PWU	Power Up	142
$\overline{\text{P4NF}}$	"Not" Period 4 Not Freezable	143
$\overline{\text{P5}}$	"Not" Period 5	144
$\overline{\text{P5NF}}$	"Not" Period 5 Not Freezable	145
$\overline{\text{RACLO}}$	"Not" Random Access Channel Lockout	146
RAR0	ROM Address Register bit 0	147
RAR1	ROM Address Register bit 1	148
RAR2	ROM Address Register bit 2	149
RAR3	ROM Address Register bit 3	150
RAR4	ROM Address Register bit 4	151
RAR5	ROM Address Register bit 5	152
RAR6	ROM Address Register bit 6	153
RAR7	ROM Address Register bit 7	154
RAR8	ROM Address Register bit 8	155

Table 2-1. Signal Name Index (Continued)

SIGNAL MNEMONIC	DEFINITION	REF NO.
RAR9	ROM Address Register bit 9	156
RAR10	ROM Address Register bit 10	157
RAR11	ROM Address Register bit 11	158
<u>READ</u>	"Not" Read	159
<u>REFRESH</u>	"Not" Refresh	160
<u>RSPE</u>	"Not" Reset Parity Error	161
<u>RIGHT</u>	"Not" Right	162
RMX	ROM, External	163
ROMEN	ROM Enable	164
ROM0	ROM bit 0	165
ROM1	ROM bit 1	166
ROM2	ROM bit 2	167
ROM3	ROM bit 3	168
ROM4	ROM bit 4	169
ROM5	ROM bit 5	170
ROM6	ROM bit 6	171
ROM7	ROM bit 7	172
ROM8	ROM bit 8	173
ROM9	ROM bit 9	174
ROM10	ROM bit 10	175
ROM11	ROM bit 11	176
ROM12	ROM bit 12	177
ROM13	ROM bit 13	178
ROM14	ROM bit 14	179
ROM15	ROM bit 15	180
ROM16	ROM bit 16	181
ROM17	ROM bit 17	182
ROM18	ROM bit 18	183
ROM19	ROM bit 19	184
ROM20	ROM bit 20	185
ROM21	ROM bit 21	186
ROM22	ROM bit 22	187
ROM23	ROM bit 23	188
RUN	Run	189
RUNB	Run Button	190
RUNEN	Run Enable	191
RUNFF	Run Flip-Flop	192
SB0	S-Bus bit 0	193
SB1	S-Bus bit 1	194

Table 2-1. Signal Name Index (Continued)

SIGNAL MNEMONIC	DEFINITION	REF NO.
SB2	S-Bus bit 2	195
SB3	S-Bus bit 3	196
SB4	S-Bus bit 4	197
SB5	S-Bus bit 5	198
SB6	S-Bus bit 6	199
SB7	S-Bus bit 7	200
SB8	S-Bus bit 8	201
SB9	S-Bus bit 9	202
SB10	S-Bus bit 10	203
SB11	S-Bus bit 11	204
SB12	S-Bus bit 12	205
SB13	S-Bus bit 13	206
SB14	S-Bus bit 14	207
SB15	S-Bus bit 15	208
SCB0	Select Code Bit 0	209
SCB1	Select Code Bit 1	210
SCB2	Select Code Bit 2	211
SCB3	Select Code Bit 3	212
SCB4	Select Code Bit 4	213
SCB5	Select Code Bit 5	214
SCL0	Select Code Least significant bit 0	215
SCL1	Select Code Least significant bit 1	216
SCL2	Select Code Least significant bit 2	217
SCL3	Select Code Least significant bit 3	218
SCL4	Select Code Least significant bit 4	219
SCL5	Select Code Least significant bit 5	220
SCL6	Select Code Least significant bit 6	221
SCL7	Select Code Least significant bit 7	222
SCM1	Select Code Most Significant bit 1	223
SCM2	Select Code Most Significant bit 2	224
SFC	Skip if Flag is Clear	225
$\overline{\text{SFP}}$	"Not" Standard Front Panel	226
SFS	Skip if Flag is Set	227
SFSB	Skip if Flag is Set (Buffered)	228
SIR	Set Interrupt Request	229
SKF	Skip on Flag	230
SRQ10	Service Request s.c. 10	231
SRQ11	Service Request s.c. 11	232
SRQ12	Service Request s.c. 12	233

Table 2-1. Signal Name Index (Continued)

SIGNAL MNEMONIC	DEFINITION	REF NO.
SRQ13	Service Request s.c. 13	234
SRQ14	Service Request s.c. 14	235
SRQ15	Service Request s.c. 15	236
SRQ16	Service Request s.c. 16	237
SRQ17	Service Request s.c. 17	238
SRQ20	Service Request s.c. 20	239
STC	Set Control	240
STF	Set Flag	241
<u>STORE</u>	"Not" Store	242
<u>STROBE</u>	"Not" Strobe	243
<u>SYNX</u>	"Not" Synchronize, External	244
TA	Time A	245
TB	Time B	246
TC	Time C	247
<u>TEN</u>	"Not" T-register Enable	248
<u>TST</u>	"Not" T-register Store	249
T3	Time 3	250
<u>WRITE</u>	"Not" Write	251

Table 2-2. Signal Distribution List

REF. NO.	SIGNAL	CPU PCA A1					FRONT PANEL PCA A2	POWER SUPPLY A3	INPUT/OUTPUT BACKPLANE A4										MEMORY BACKPLANE A5										CROSSOVER PCA A6				ROM 1 PCA A7		ROM 2 PCA A8		ROM 3 PCA A9		REF. NO.	
		FRONT PANEL PCA A2	ROM 1 PCA A7	I/O EXT HP 12979A					I/O S.C. 10	I/O S.C. 11	I/O S.C. 12	I/O S.C. 13	I/O S.C. 14	I/O S.C. 15	I/O S.C. 16	I/O S.C. 17	I/O S.C. 20	DCPC PCA P1	MEMORY PROTECT PCA P1	MEMORY EXPANSION PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	DCPC PCA J1	POWER SUPPLY A3			J1	P1/J2	J1	P1/J2	J1	P1/J2				
					J1	J2																							J3	XA4							XA5	P1		**
1	CLC				29				21	21	21	21	21	21	21	21	21	66												22	65									1
2	CLF				17				7	7	7	7	7	7	7	7	7		80								32			8	79									2
3	CLKX			30																																				3
4	CLXEN			32																																				4
5	CRS				23				13	13	13	13	13	13	13	13	13	74												14	73									5
6	CTL5																		13	18																				6
7	DECM	20					20																																	7
8	DIEN	27					27																																	8
9	DISPLAY	24					24																																	9
10	DIST	26					26																																	10
11	DMACYC					26												56		56	56	56	56	56	56	56														11
12	DMAEN					23												41		51	51	51	51	51	51	51														12
13	DMAFRZ					4												10	10	10	10	10	10	10	10	10														13
14	DMAIOI					20												25																						14
15	DMAIOO					7												14																						15
16	DMALCH					83												83																						16
17	DMALO					69												57		57	57	57	57	57	57	57													17	
18	DMAREAD																	81		81	81	81	81	81	81	81													18	
19	DMARQ1					24												55																						19
20	DMARQ2					31												59																						20
21	DSPCL	35					35																																	21
22	DSPEN	33					33																																	22
23	DSPST	34					34																																	23
24	EDT				63				62	62	62	62	62	62	62	62	62										10			61										24
25	ENF				58				46	46	46	46	46	46	46	46	46		41											45	42									25

*PINS ACCESSIBLE FOR MAINTENANCE AT TOP OF CROSSOVER PCA A6.

**SEE FIGURE 2-9



DENOTES SIGNAL SOURCE.



DENOTES BIDIRECTIONAL SIGNAL.

■ DENOTES SLOTS NOT AVAILABLE IN HP 2105A.

Table 2-2. Signal Distribution List (Continued)

REF. NO.	SIGNAL	CPU PCA A1					FRONT PANEL PCA A2	POWER SUPPLY A3	INPUT/OUTPUT BACKPLANE A4										MEMORY BACKPLANE A5										CROSSOVER PCA A6				ROM 1 PCA A7		ROM 2 PCA A8		ROM 3 PCA A9		REF. NO.
		FRONT PANEL PCA A2	ROM 1 PCA A7	I/O EXT HP12979A					I/O S.C. 10	I/O S.C. 11	I/O S.C. 12	I/O S.C. 13	I/O S.C. 14	I/O S.C. 15	I/O S.C. 16	I/O S.C. 17	I/O S.C. 20	DCPC PCA P1	MEMORY PROTECT PCA P1	MEMORY EXPANSION PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	DCPC PCA J1	POWER SUPPLY A3			J1	P1/J2	J1	P1/J2	J1	P1/J2			
					J1	J2																							J3	XA4							XA5	P1	
26	ENRMX		38																																			26	
27	EXFF	29					29																															27	
28	FPSP	38					38																															28	
29	FRZFF					76													76	76	76	76	76	76	76	76											29		
30	FTCH					27												57																				30	
31	FLASH				49			J4-3																				3	63									31	
32	FLG1				61				4 49	4 49	4 49	4 49	4 49	4 49	4 49	4																						32	
33	FLG2				45												49	4 49																				33	
34	FLG5					16												29																				34	
35	HLTB	31					31																															35	
36	HLTPE					8												17																				36	
37	IAK				16				10	10	10	10	10	10	10	10	10	77	77	77	77	77	77	77	77	77			9	78							37		
38	IA0			48																																		38	
39	IA1			46																																		39	
40	IA2			44																																		40	
41	IA3			42																																		41	
42	IA4			40																																		42	
43	IA5			38																																		43	
44	IBL	17					17																															44	
45	IEN5					79												79	79																		45		
46	IEN10				20				8	8	8	8	8	8	8	8																					46		
47	IEN20				7												8 23																				47		
48	INCI					74												76																			48		
49	INCM	19					19																															49	
50	INSTEP	18					18																															50	

*PINS ACCESSIBLE FOR MAINTENANCE AT TOP OF CROSSOVER PCA A6.
**SEE FIGURE 2-9

 DENOTES SIGNAL SOURCE.  DENOTES BIDIRECTIONAL SIGNAL.  DENOTES SLOTS NOT AVAILABLE IN HP 2105A.

Table 2-2. Signal Distribution List (Continued)

REF. NO.	SIGNAL	CPU PCA A1					FRONT PANEL PCA A2	POWER SUPPLY A3	INPUT/OUTPUT BACKPLANE A4										MEMORY BACKPLANE A5										CROSSOVER PCA A6				ROM 1 PCA A7		ROM 2 PCA A8		ROM 3 PCA A9		REF. NO.
		FRONT PANEL PCA A2	ROM 1 PCA A7	I/O EXT HP12979A					I/O S.C. 10	I/O S.C. 11	I/O S.C. 12	I/O S.C. 13	I/O S.C. 14	I/O S.C. 15	I/O S.C. 16	I/O S.C. 17	I/O S.C. 20	DCPC PCA P1	MEMORY PROTECT PCA P1	MEMORY EXPANSION PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	DCPC PCA J1	POWER SUPPLY A3										
					J1	J2																								J3	XA4	XA5	P1	**	XA10	XA11	XA12	XA13	
51	INTL	44					44																															51	
52	INTX			36																																		52	
53	IOB0				68				26 35	26 35	26 35	26 35	26 35	26 35	26 35	26 35	26 35																					53	
54	IOB1				66				29 38	29 38	29 38	29 38	29 38	29 38	29 38	29 38	29 38																					54	
55	IOB2				72				30 41	30 41	30 41	30 41	30 41	30 41	30 41	30 41	30 41																					55	
56	IOB3				71				64 45	64 45	64 45	64 45	64 45	64 45	64 45	64 45	64 45																					56	
57	IOB4				74				77 42	77 42	77 42	77 42	77 42	77 42	77 42	77 42	77 42																					57	
58	IOB5				73				80 51	80 51	80 51	80 51	80 51	80 51	80 51	80 51	80 51																					58	
59	IOB6				76				81 53	81 53	81 53	81 53	81 53	81 53	81 53	81 53	81 53																					59	
60	IOB7				75				84 52	84 52	84 52	84 52	84 52	84 52	84 52	84 52	84 52																					60	
61	IOB8				78				27 54	27 54	27 54	27 54	27 54	27 54	27 54	27 54	27 54																					61	
62	IOB9				77				28 56	28 56	28 56	28 56	28 56	28 56	28 56	28 56	28 56																					62	
63	IOB10				80				31 58	31 58	31 58	31 58	31 58	31 58	31 58	31 58	31 58																					63	
64	IOB11				79				60 55	60 55	60 55	60 55	60 55	60 55	60 55	60 55	60 55																					64	
65	IOB12				82				78 57	78 57	78 57	78 57	78 57	78 57	78 57	78 57	78 57																					65	
66	IOB13				81				79 61	79 61	79 61	79 61	79 61	79 61	79 61	79 61	79 61																					66	
67	IOB14				84				82 65	82 65	82 65	82 65	82 65	82 65	82 65	82 65	82 65																					67	
68	IOB15				83				83 74	83 74	83 74	83 74	83 74	83 74	83 74	83 74	83 74																					68	
69	IOB16				31				18	18	18	18	18	18	18	18	18																					69	
70	IOG				25				15	15	15	15	15	15	15	15	15	68	68										20	67							70		
71	IOGSP					70													66																		71		
72	IOI				30				24	24	24	24	24	24	24	24	24	63	63										23	64							72		
73	IOO				26				20	20	20	20	20	20	20	20	20	67	67										19	68							73		
74	IRQ0				12				6								33	6																			74		
75	IRQ1				38				33	6								33																			75		

*PINS ACCESSIBLE FOR MAINTENANCE AT TOP OF CROSSOVER PCA A6.

**SEE FIGURE 2-9



DENOTES SIGNAL SOURCE.



DENOTES BIDIRECTIONAL SIGNAL.

■ DENOTES SLOTS NOT AVAILABLE IN HP 2105A.

Table 2-2. Signal Distribution List (Continued)

REF. NO.	SIGNAL	CPU PCA A1					FRONT PANEL PCA A2	POWER SUPPLY A3	INPUT/OUTPUT BACKPLANE A4										MEMORY BACKPLANE A5										CROSSOVER PCA A6				ROM 1 PCA A7		ROM 2 PCA A8		ROM 3 PCA A9		REF. NO.
		FRONT PANEL PCA A2	ROM 1 PCA A7	I/O EXT HP12979A					I/O S.C. 10	I/O S.C. 11	I/O S.C. 12	I/O S.C. 13	I/O S.C. 14	I/O S.C. 15	I/O S.C. 16	I/O S.C. 17	I/O S.C. 20	DCPC PCA P1	MEMORY PROTECT PCA P1	MEMORY EXPANSION PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	DCPC PCA J1	POWER SUPPLY A3			J1	P1/J2	J1	P1/J2	J1	P1/J2			
					J1	J2																							J3	XA4							XA5	P1	
76	IRQ2				36					33	6																											76	
77	IRQ3				10						33	6																										77	
78	IRQ4				8							33	6																									78	
79	IRQ5				4								33	6					83															3	84				79
80	IRQ6				13									33	6												34							5					80
81	IRQ7				11											33	6										38							7					81
82	IRSTF					12													25			33	33	33	33	33	33												82
83	LEFT	22					22																																83
84	LEGAL					40													21			41	41	41	41	41	41					14	19		19		19		84
85	MBEN					29															25	25	25	25	25	25													85
86	MB0				67														72	72	72	72	72	72	72	72													86
87	MB1				65														61	61	61	61	61	61	61	61													87
88	MB2				63														54	54	54	54	54	54	54	54													88
89	MB3				61														52	52	52	52	52	52	52	52													89
90	MB4				59														50	50	50	50	50	50	50	50													90
91	MB5				57														46	46	46	46	46	46	46	46													91
92	MB6				55														42	42	42	42	42	42	42	42													92
93	MB7				53														37	37	37	37	37	37	37	37													93
94	MB8				51														32	32	32	32	32	32	32	32													94
95	MB9				49														28	28	28	28	28	28	28	28													95
96	MB10				45														24	24	24	24	24	24	24	24													96
97	MB11				43														20	20	20	20	20	20	20	20													97
98	MB12				41														16	16	16	16	16	16	16	16													98
99	MB13				37														12	12	12	12	12	12	12	12													99
100	MB14				35														8	8	8	8	8	8	8	8													100

*PINS ACCESSIBLE FOR MAINTENANCE AT TOP OF CROSSOVER PCA A6.
**SEE FIGURE 2-9



DENOTES SIGNAL SOURCE.



DENOTES BIDIRECTIONAL SIGNAL.

■ DENOTES SLOTS NOT AVAILABLE IN HP 2105A.

Table 2-2. Signal Distribution List (Continued)

REF. NO.	SIGNAL	CPU PCA A1					FRONT PANEL PCA A2	POWER SUPPLY A3	INPUT/OUTPUT BACKPLANE A4										MEMORY BACKPLANE A5										CROSSOVER PCA A6				ROM 1 PCA A7		ROM 2 PCA A8		ROM 3 PCA A9		REF. NO.	
		FRONT PANEL PCA A2	ROM 1 PCA A7	I/O EXT HP12979A					I/O S.C. 10	I/O S.C. 11	I/O S.C. 12	I/O S.C. 13	I/O S.C. 14	I/O S.C. 15	I/O S.C. 16	I/O S.C. 17	I/O S.C. 20	DCPC PCA P1	MEMORY PROTECT PCA P1	MEMORY EXPANSION PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	DCPC PCA J1	POWER SUPPLY A3			J1	P1/J2	J1	P1/J2	J1	P1/J2				
					J1	J2																							J3	XA4							XA5	P1		**
101	MB15					33												4	4	4	4	4	4	4	4													101		
102	MEBEN																			67	67	67	67	67	67	67												102		
103	MEB10																			83	83	83	83	83	83	83												103		
104	MEB11																			79	79	79	79	79	79	79												104		
105	MEB12																			75	75	75	75	75	75	75												105		
106	MEB13																			68	68	68	68	68	68	68												106		
107	MEB14																			62	62	62	62	62	62	62												107		
108	MEB15																			55	55	55	55	55	55	55												108		
109	MEB16																			21	21	21	21	21	21	21												109		
110	MEB17																			17	17	17	17	17	17	17												110		
111	MEB18																			13	13	13	13	13	13	13												111		
112	MEB19																			5	5	5	5	5	5	5												112		
113	MECND					28														41																			113	
114	MEEN					48														22																			114	
115	MESP					32														33																			115	
116	MEST					39														34	34	34	34	34	34	34													116	
117	MEV																		73	73																			117	
118	MLOST					77		J4-6																				6		80										118
118A	MPCND																		5	6																			118A	
119	MPCK					25													56																				119	
120	MPINTON					10													18																				120	
121	MPV					14													14	14	14	14	14	14	14	14													121	
122	MSRDY					73														73	73	73	73	73	73	73													122	
123	OVERFF	28					28																																	123
124	PARFF	32					32																																	124

*PINS ACCESSIBLE FOR MAINTENANCE AT TOP OF CROSSOVER PCA A6.

**SEE FIGURE 2-9



DENOTES SIGNAL SOURCE.



DENOTES BIDIRECTIONAL SIGNAL.

■ DENOTES SLOTS NOT AVAILABLE IN HP 2105A.

Table 2-2. Signal Distribution List (Continued)

REF. NO.	SIGNAL	CPU PCA A1					FRONT PANEL PCA A2	POWER SUPPLY A3	INPUT/OUTPUT BACKPLANE A4										MEMORY BACKPLANE A5										CROSSOVER PCA A6				ROM 1 PCA A7		ROM 2 PCA A8		ROM 3 PCA A9		REF. NO.
		FRONT PANEL PCA A2	ROM 1 PCA A7	I/O EXT HP 12979A					I/O S.C. 10	I/O S.C. 11	I/O S.C. 12	I/O S.C. 13	I/O S.C. 14	I/O S.C. 15	I/O S.C. 16	I/O S.C. 17	I/O S.C. 20	DCPC PCA P1	MEMORY PROTECT PCA P1	MEMORY EXPANSION PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	DCPC PCA J1	POWER SUPPLY A3			J1	P1/J2	J1	P1/J2	J1	P1/J2			
					J1	J2	J3	XA4																					XA5	P1							**	XA10	
125	PE					72													59	59	59	59	59	59	59												125		
126	PF	7					7																														126		
127	PON				65		J4-2	66	66	66	66	66	66	66	66	66			26	26	26	26	26	26	26		2	65	22							127			
128	POPIO				27			17	17	17	17	17	17	17	17	17	73	74	74	74	74	74	74	74	74			13	74							128			
129	PRH6					5											13																			129			
130	PRH10				32			23																												130			
131	PRL4/PRH5					81												81								40			82							131			
132	PRL7					3											5																			132			
133	PRL10/PRH11							3	23																											133			
134	PRL11/PRH12								3	23																										134			
135	PRL12/PRH13									3	23																									135			
136	PRL13/PRH14				3†							3	23																							136			
137	PRL14/PRH15												3	23																						137			
138	PRL15/PRH16													3	23																					138			
139	PRL16/PRH17														3	23																				139			
140	PRL17				9											3																				140			
141	PRSTB	16					16																													141			
142	PWU			26	55		J4-1																				1	68								142			
143	P4NF					47											76		63	63	63	63	63	63	63										143				
144	P5	37					37																													144			
145	P5NF					84											84	84	84	84	84	84	84	84	84										145				
146	RACLO																29		65	65/66	65/66	65/66	65/66	65/66	65										146				
147	RAR0		33																											33	48		48		48	147			
148	RAR1		31																											31	50		50		50	148			
149	RAR2		29																											29	49		49		49	149			

*PINS ACCESSIBLE FOR MAINTENANCE
AT TOP OF CROSSOVER PCA A6.

**SEE FIGURE 2-9



DENOTES SIGNAL SOURCE.



DENOTES BIDIRECTIONAL SIGNAL.

■ DENOTES SLOTS NOT AVAILABLE IN HP 2105A.

† 2105A ONLY

Table 2-2. Signal Distribution List (Continued)

REF. NO.	SIGNAL	CPU PCA A1					FRONT PANEL PCA A2	POWER SUPPLY A3	INPUT/OUTPUT BACKPLANE A4										MEMORY BACKPLANE A5										CROSSOVER PCA A6				ROM 1 PCA A7		ROM 2 PCA A8		ROM 3 PCA A9		REF. NO.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
		FRONT PANEL PCA A2	ROM 1 PCA A7	I/O EXT HP12979A					FRONT PANEL PCA A2	I/O S.C. 10	I/O S.C. 11	I/O S.C. 12	I/O S.C. 13	I/O S.C. 14	I/O S.C. 15	I/O S.C. 16	I/O S.C. 17	I/O S.C. 20	DCPC PCA P1	MEMORY PROTECT PCA P1	MEMORY EXPANSION PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	DCPC PCA J1	POWER SUPPLY A3			ROM 1 PCA A7	ROM 2 PCA A8	ROM 3 PCA A9																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
					J1	J2																									J3	XA4				XA5	P1	**		XA10	XA11	XA12	XA13	XA14	XA15	XA16	XA17	XA20	XA110	XA111	XA112	XA113	XA114	XA115	XA116	XA117	XA118	J1	J2	XA4*	XA5*	J1	P1/J2	J1	P1/J2	J1	P1/J2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
150	RAR3		23																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												

*PINS ACCESSIBLE FOR MAINTENANCE AT TOP OF CROSSOVER PCA A6.

**SEE FIGURE 2-9

DENOTES SIGNAL SOURCE.

DENOTES BIDIRECTIONAL SIGNAL.

DENOTES SLOTS NOT AVAILABLE IN HP 2105A.

Table 2-2. Signal Distribution List (Continued)

REF. NO.	SIGNAL	CPU PCA A1					FRONT PANEL PCA A2	POWER SUPPLY A3	INPUT/OUTPUT BACKPLANE A4								MEMORY BACKPLANE A5										CROSSOVER PCA A6				ROM 1 PCA A7		ROM 2 PCA A8		ROM 3 PCA A9		REF. NO.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
		FRONT PANEL PCA A2	ROM 1 PCA A7	I/O EXT HP12979A					I/O S.C. 10	I/O S.C. 11	I/O S.C. 12	I/O S.C. 13	I/O S.C. 14	I/O S.C. 15	I/O S.C. 16	I/O S.C. 17	I/O S.C. 20	DCPC PCA P1	MEMORY PROTECT PCA P1	MEMORY EXPANSION PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	DCPC PCA J1	POWER SUPPLY A3																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
							J1	J2																								J3	XA4	XA5	P1	**		XA10	XA11	XA12	XA13	XA14	XA15	XA16	XA17	XA20	XA110	XA111	XA112	XA113	XA114	XA115	XA116	XA117	XA118	J1	J2	XA4*	XA5*	J1	P1/J2	J1	P1/J2	J1	P1/J2																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
175	ROM10		13																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							

*PINS ACCESSIBLE FOR MAINTENANCE AT TOP OF CROSSOVER PCA A6.

**SEE FIGURE 2-9

 DENOTES SIGNAL SOURCE.

 DENOTES BIDIRECTIONAL SIGNAL.

 DENOTES SLOTS NOT AVAILABLE IN HP 2105A.

Table 2-2. Signal Distribution List (Continued)

REF. NO.	SIGNAL	CPU PCA A1					FRONT PANEL PCA A2	POWER SUPPLY A3	INPUT/OUTPUT BACKPLANE A4									MEMORY BACKPLANE A5										CROSSOVER PCA A6				ROM 1 PCA A7		ROM 2 PCA A8		ROM 3 PCA A9		REF. NO.
		FRONT PANEL PCA A2	ROM 1 PCA A7	I/O EXT HP12979A					I/O S.C. 10	I/O S.C. 11	I/O S.C. 12	I/O S.C. 13	I/O S.C. 14	I/O S.C. 15	I/O S.C. 16	I/O S.C. 17	I/O S.C. 20	DCPC PCA P1	MEMORY PROTECT PCA P1	MEMORY EXPANSION PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	DCPC PCA J1	POWER SUPPLY A3			J1	P1/J2	J1	P1/J2	J1	P1/J2		
					J1	J2																							J3	XA4							XA5	
200	SB7	39				54	39											35	35	35	35	35	35	35	35	35											200	
201	SB8	12				52	12											31	31	31	31	31	31	31	31	31											201	
202	SB9	11				50	11											27	27	27	27	27	27	27	27	27											202	
203	SB10	9				46	9											23	23	23	23	23	23	23	23	23											203	
204	SB11	8				44	8											19	19	19	19	19	19	19	19	19											204	
205	SB12	6				42	6											15	15	15	15	15	15	15	15	15											205	
206	SB13	5				38	5											11	11	11	11	11	11	11	11	11											206	
207	SB14	3				36	3											7	7	7	7	7	7	7	7	7											207	
208	SB15	2				34	2											3	3	3	3	3	3	3	3	3											208	
209	SCB0			16		11												22	22																			209
210	SCB1			14		13												26	26																			210
211	SCB2			12		15												30	30																			211
212	SCB3			10		17												33	33																			212
213	SCB4			8		19												34	34																			213
214	SCB5			6		21												51	51																			214
215	SCL0				24				16							34	16																					215
216	SCL1				42				34	16							34																					216
217	SCL2				34					34	16																											217
218	SCL3				43						34	16																										218
219	SCL4				41							34	16																									219
220	SCL5				39								34	16																								220
221	SCL6				37									34	16																							221
222	SCL7				35										34	16																						222
223	SCM1				46				14 37	14 37	14 37	14 37	14 37	14 37	14 37	14 37	14																					223
224	SCM2				15											37	14 37																					224

*PINS ACCESSIBLE FOR MAINTENANCE AT TOP OF CROSSOVER PCA A6.

**SEE FIGURE 2-9

 DENOTES SIGNAL SOURCE.

 DENOTES BIDIRECTIONAL SIGNAL.

 DENOTES SLOTS NOT AVAILABLE IN HP 2105A.

Table 2-2. Signal Distribution List (Continued)

REF. NO.	SIGNAL	CPU PCA A1					FRONT PANEL PCA A2	POWER SUPPLY A3	INPUT/OUTPUT BACKPLANE A4								MEMORY BACKPLANE A5								CROSSOVER PCA A6				ROM 1 PCA A7		ROM 2 PCA A8		ROM 3 PCA A9		REF. NO.		
		FRONT PANEL PCA A2	ROM 1 PCA A7	I/O EXT HP12979A					I/O S.C. 10	I/O S.C. 11	I/O S.C. 12	I/O S.C. 13	I/O S.C. 14	I/O S.C. 15	I/O S.C. 16	I/O S.C. 17	I/O S.C. 20	DCPC PCA P1	MEMORY PROTECT PCA P1	MEMORY EXPANSION PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	DCPC PCA J1	POWER SUPPLY A3			J1	P1/J2	J1	P1/J2		J1	P1/J2
					J1	J2																							J3	XA4							
225	SFC				14				5	5	5	5	5	5	5	5	5		82								36		6	81							225
226	SFP	30					30																														226
227	SFS				33				25	25	25	25	25	25	25	25	25	62	62										26	61							227
228	SFSB								73	73	73	73	73	73	73	73	73																				228
229	SIR				40				32	32	32	32	32	32	32	32	32		55										31	56							229
230	SKF				22				12	12	12	12	12	12	12	12	12	75	75										11	76							230
231	SRQ10								19																	30		24									231
232	SRQ11									19																28		25									232
233	SRQ12										19															26		46									233
234	SRQ13											19														24		56									234
235	SRQ14												19													22		55									235
236	SRQ15													19												20		58									236
237	SRQ16														19											18		57									237
238	SRQ17															19										16		60									238
239	SRQ20																19									14		59									239
240	STC				28				22	22	22	22	22	22	22	22	22	65	65										21	66							240
241	STF				19				9	9	9	9	9	9	9	9	9	78	78										10	77							241
242	STORE	23					23																														242
243	STROBE	25					25																														243
244	SYNX			34																																	244
245	TA					71												60		60	60	60	60	60	60											245	
246	TB					18												18			18	18	18	18	18											246	
247	TC					22												21			22	22	22	22	22											247	
248	TEN					80												80		80	80	80	80	80	80											248	
249	TST					82												82		82	82	82	82	82	82											249	

*PINS ACCESSIBLE FOR MAINTENANCE AT TOP OF CROSSOVER PCA A6.

**SEE FIGURE 2-9



DENOTES SIGNAL SOURCE.



DENOTES BIDIRECTIONAL SIGNAL.

■ DENOTES SLOTS NOT AVAILABLE IN HP 2105A.

Table 2-2. Signal Distribution List (Continued)

REF. NO.	SIGNAL	CPU PCA A1					FRONT PANEL PCA A2	POWER SUPPLY A3	INPUT/OUTPUT BACKPLANE A4								MEMORY BACKPLANE A5								CROSSOVER PCA A6				ROM 1 PCA A7		ROM 2 PCA A8		ROM 3 PCA A9		REF. NO.			
		FRONT PANEL PCA A2	ROM 1 PCA A7	I/O EXT HP12979A					FRONT PANEL PCA A2	I/O S.C. 10	I/O S.C. 11	I/O S.C. 12	I/O S.C. 13	I/O S.C. 14	I/O S.C. 15	I/O S.C. 16	I/O S.C. 17	I/O S.C. 20	DCPC PCA P1	MEMORY PROTECT PCA P1	MEMORY EXPANSION PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	MEMORY PCA P1	DCPC PCA J1	POWER SUPPLY A3									
					J1	J2																								J3	XA4	XA5	P1	**		XA10	XA11	XA12
250	T3				21				11	11	11	11	11	11	11	11																						250
251	WRITE					6											6	6		6	6	6	6	6	6												251	

***PINS ACCESSIBLE FOR MAINTENANCE
AT TOP OF CROSSOVER PCA A6.**

****SEE FIGURE 2-9**



DENOTES SIGNAL SOURCE.



DENOTES BIDIRECTIONAL SIGNAL.

■ DENOTES SLOTS NOT AVAILABLE IN HP 2105A.

REPLACEABLE PARTS

SECTION

III

This section provides a field-replaceable parts listing and an illustrated parts breakdown of the HP 2105A and HP 2108A Microprogrammable Processors. Component parts of printed-circuit assemblies (PCA's) are not included, since these parts are considered replaceable only at the factory or a depot. Also included in this section is a listing of subassemblies that comprise the HP 2101A and HP 2102A Memory Systems.

3-1. PROCESSOR REPLACEABLE PARTS

Tables 3-1 and 3-2 and figures 3-1 and 3-2, respectively, list and illustrate the field-replaceable parts of the HP 2105A and HP 2108A Microprogrammable Processors. The replaceable parts are referenced to the exploded views by index numbers. The columns in the index numbered lists provide the following information for each part:

- a. FIG. & INDEX NO. The figure and index number where the replaceable parts are shown in an exploded view.
- b. HP PART NO. The HP part number for each replaceable part.
- c. DESCRIPTION. The description of each replaceable part and its applicable reference designation.
- d. MFR CODE. A five digit code that denotes the manufacturer of the part.

- e. MFR PART NO. The manufacturer's part number for each replaceable part.
- f. UNITS PER ASSY. The total quantity of each replaceable part of the processor or memory system.

3-2. MEMORY SYSTEM REPLACEABLE PARTS

Table 3-3 lists the field-replaceable parts of the HP 2101A and HP 2102A Memory Systems. Memory modules and memory controllers are unique to each memory system and cannot be intermixed with similar components of the alternative system.

3-3. ORDERING INFORMATION

To order replaceable parts, address the order to the local Hewlett-Packard Sales and Service Office listed at the end of this manual. (For I/O interface card or I/O device ordering information, refer to their respective manuals.) The following information should be included in the order for each replaceable parts:

- a. Complete model number (including options and accessories) and serial number.
- b. Hewlett-Packard part number for each part.
- c. Complete description for each part as provided in the replaceable parts lists.

Table 3-1. HP 2105A Processor Replaceable Parts

FIG & INDEX NO.	HP PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NO.	UNITS PER ASSY.
3-1-	2105A	MICROPROGRAMMABLE PROCESSOR	28480	2105A	1
1	5060-8352	*Central Processor Unit A1	28480	5060-8352	1
2	02105-60012	*Power Supply A2	28480	02105-60012	1
3	5060-8343	*Operator Panel PCA A3	28480	5060-8343	1
3A	5040-6076	**Switch (Mint Gray)	28480	5040-6076	13
—	5040-6077	**Switch (Jade Gray)	28480	5040-6077	9
3B	02108-00014	**Contact, Spring	28480	02108-00014	22
4	02105-60002	*Input/Output Backplane A4	28480	02105-60002	1
5	02105-60005	*Memory Backplane A5	28480	02105-60005	1
6	5060-8345	*Crossover PCA A6	28480	5060-8345	1
7	5060-8344	*Connector Assembly	28480	5060-8344	1
8	Note 1	*Control Store ROM A9	28480		
9	5060-8370	*Control Store ROM A8	28480	5060-8370	1
10	5060-8351	*Control Store ROM A7	28480	5060-8351	1
11	Note 2	*I/O PCA Cage	28480		1
12	Note 3	*Memory PCA Cage	28480		1
13	3160-0224	*Fan, Tubeaxial	28480	3160-0224	2
14	Note 4	*Power Fail Recovery System	28480		1
15	2110-0055	*Fuse, 4A, Fast-blow (110V operation)	28480	2110-0055	1
15	2110-0002	*Fuse, 2A, Slow-blow (220V operation)	28480	2110-0002	
		NOTES:			
		1. Either HP option or User designed.			
		2. I/O PCA cage not field replaceable; shown only for reference.			
		3. Memory PCA cage not field replaceable; see Table 3-3 for memory options.			
		4. Part of memory options; see Table 3-3.			

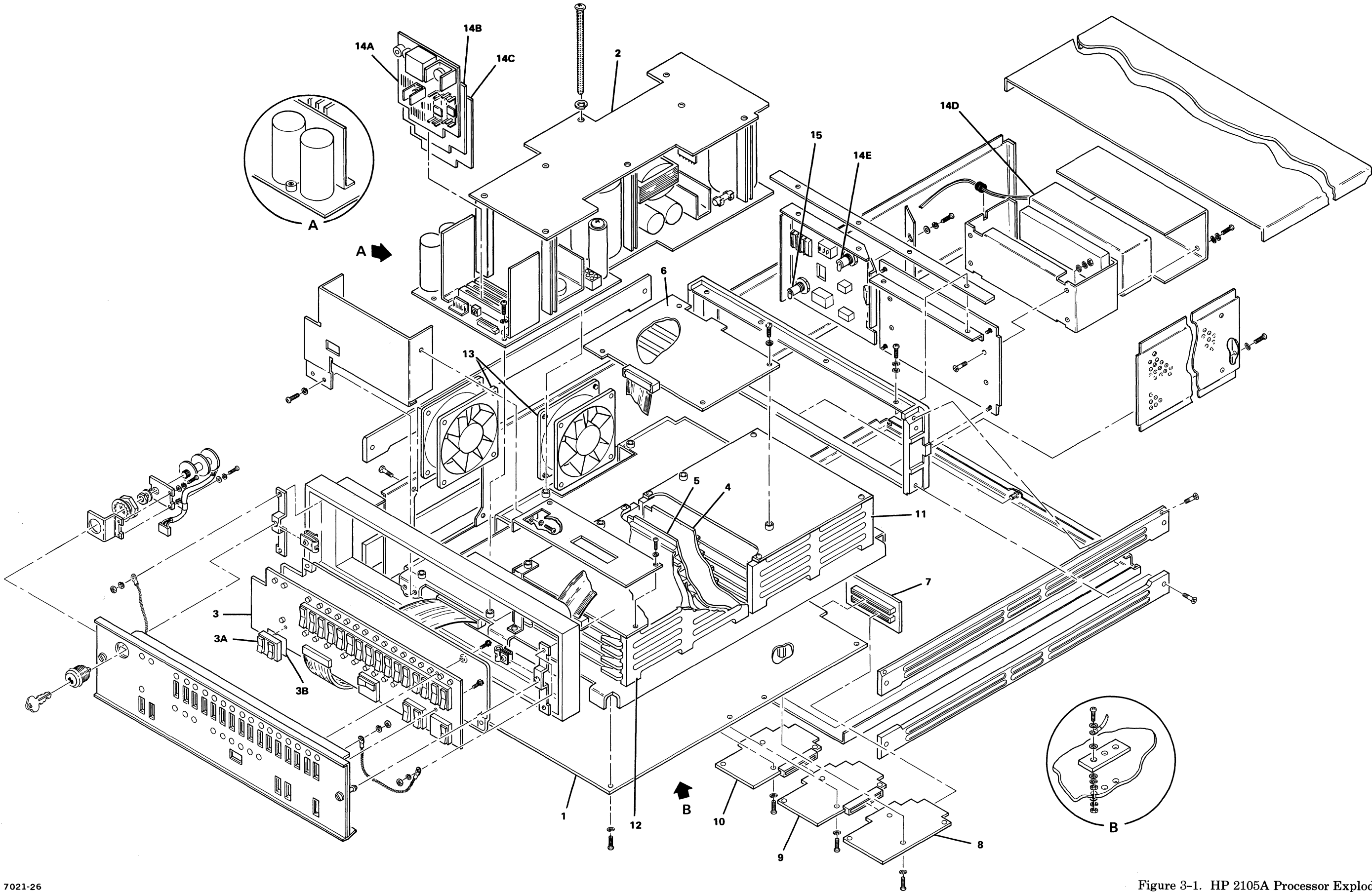


Figure 3-1. HP 2105A Processor Exploded View

Table 3-2. HP 2108A Processor Replaceable Parts

FIG & INDEX NO.	HP PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NO.	UNITS PER ASSY.
3-2-	2108A	MICROPROGRAMMABLE PROCESSOR	28480	2108A	1
1	5060-8352	*Central Processor Unit A1	28480	5060-8352	1
2	02108-60012	*Power Supply A2	28480	02108-60012	1
3	5060-8343	*Operator Panel PCA A3	28480	5060-8343	1
3A	5040-6076	**Switch (Mint Gray)	28480	5040-6076	13
—	5040-6077	**Switch (Jade Gray)	28480	5040-6077	9
3B	02108-00014	**Contact, Spring	28480	02108-00014	22
4	02108-60002	*Input/Output Backplane A4	28480	02108-60002	1
5	02108-60005	*Memory Backplane A5	28480	02108-60005	1
6	5060-8345	*Crossover PCA A6	28480	5060-8345	1
7	5060-8344	*Connector Assembly	28480	5060-8344	1
8	Note 1	*Control Store ROM A9	28480		
9	5060-8370	*Control Store ROM A8	28480	5060-8370	1
10	5060-8351	*Control Store ROM A7	28480	5060-8351	1
11	Note 2	*I/O PCA Cage	28480		1
12	Note 3	*Memory PCA Cage	28480		1
13	3160-0224	*Fan, Tubeaxial	28480	3160-0224	2
14	Note 4	*Power Fail Recovery System	28480		
15	2110-0056	*Fuse, 6A, Fast-blow (110V operation)	28480	2110-0056	1
15	2110-0055	*Fuse, 4A, Fast-blow (220V operation)	28480	2110-0055	1
		NOTES:			
		1. Either HP option or User designed.			
		2. I/O PCA cage not field replaceable; shown only for reference.			
		3. Memory PCA cage not field replaceable; see Table 3-3 for memory options.			
		4. Part of memory options; see Table 3-3.			

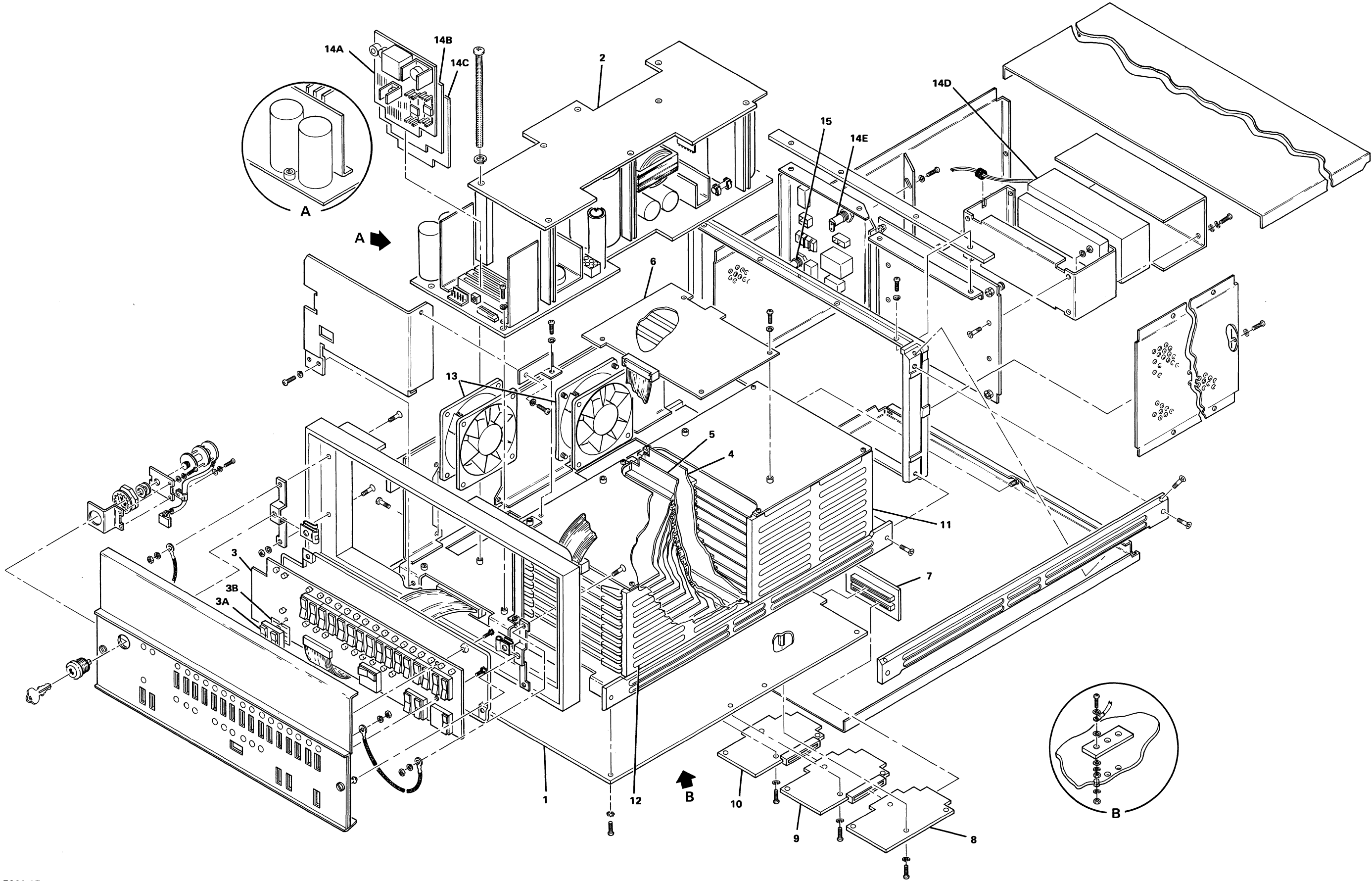


Figure 3-2. HP 2108A Processor Exploded View

Table 3-3. HP 2101A and HP 2102A Memory Systems Replaceable Parts

FIG & INDEX NO.	HP PART NO.	DESCRIPTION	MFR. CODE	MFR. PART NO.	UNITS PER ASSY.
3-1- 3-2-	2101A	MOS MEMORY SYSTEM (HIGH DENSITY)	28480	2101A	1
—		*Memory Controller PCA	28480		1
—	12999A	*8K Memory Module	28480	12999A	Note 1
—	12997A	*16K Memory Module	28480	12997A	Note 1
—	12993A	*Memory System Cable	28480	12993A	1
—	12897A	*Dual-Channel Port Controller	28480	12897A	1
—	12892A	*Memory Protect (not used with 2105A)	28480	12892A	1
—	12944A	*Power Fail Recovery System	28480	12944A	1
14A	5060-8346	**Battery Output PCA	28480	5060-8346	1
14B	5060-8347	**Battery Control I PCA	28480	5060-8347	1
14C	5060-8353	**Battery Control II PCA	28480	5060-8353	1
14D	1420-0206	**Battery Pack	28480	1420-0206	1
14E	2110-0010	**Fuse, 5A, NB	28480	2110-0010	1
—	2102A	MOS MEMORY SYSTEM (MEDIUM DENSITY)	28480	2102A	1
—		*Memory Controller PCA	28480		1
—	12994A	*4K Memory Module	28480	12994A	Note 1
—	12998A	*8K Memory Module	28840	12998A	Note 1
—	12993A	*Memory System Cable	28480	12993A	1
—	12897A	*Dual-Channel Port Controller	28480	12897A	1
—	12892A	*Memory Protect (not used with 2105A)	28480	12892A	1
—	12944A	*Power Fail Recovery System	28480	12944A	1
14A	5060-8346	**Battery Output PCA	28480	5060-8346	1
14B	5060-8347	**Battery Control I PCA	28480	5060-8347	1
14C	5060-8353	**Battery Control II PCA	28480	5060-8353	1
14D	1420-0206	**Battery Pack	28480	1420-0206	1
14E	2110-0010	**Fuse, 5A, NB	28480	2110-0010	1
		NOTES:			
		1. Depends on particular installation.			

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